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[OFFICIAL NOTICE.]

Wrinkle Department, Western Gas Association.

WRINKLE DEPARTMENT WESTERN GAS ASSOCIATION,
OFFICE OF THE EDITOR,
112 NORTH BROAD ST., PHILA., PA., Feb. 16, 1900.

To the Members of the Western Gas Association: The Western Gas Association elected me last year Editor of its Wrinkle Department. The duty of the Editor is the securing (for presentation in convenient form to the Association, at its annual meeting), all possible wrinkles, ideas, devices, suggestions, etc., that during the year have been found by the members to be clever and helpful, in either the construction or operation of a gas works or company.

The success of the Wrinkle Department has been marked. It is looked forward to yearly with interest. *Its success, however, is dependent on the co-operation of the members.* Will you not kindly help the success of this feature at this year's meeting by sending me shortly a brief description of any thing or idea that you may have recently noticed, or that occurs to you as suitable for a "wrinkle?" Whether this be something noted by either yourself or your assistants or helpers, in your own works or in those of another, is not material. It is the point itself that is desired, and that each member is asked to kindly contribute, whenever possible.

Drawings necessary to illustrate an idea need not be exact or carefully made, a simple rough sketch will be sufficient, and will be redrawn here if desirable. Your active co-operation in the above will be appreciated by the Association at large, and by the Wrinkle Editor in particular. Very truly yours, F. H. SHELTON, Editor.

LIBRARY OF CONGRESS. APR 3 1900 SMITHSONIAN DEPOSIT

BRIEFLY TOLD.

ANNUAL MEETING OF THE SOUTHWESTERN GAS, ELECTRIC AND STREET RAILWAY ASSOCIATION.—Mr. T. H. Stuart, Secretary of the Southwestern Association, informs us that its next annual meeting will be held in Waco, Texas, April 12, 13 and 14, instead of April 18, 19 and 20, as originally announced. The change in meeting time was determined upon because, as the convention of the Lumbermen's Association was set for April 10, 11 and 12 in Waco, much more favorable arrangements in respect of railroad fares could be made were the sessions of both Associations fixed to follow each other. Again, the Grand Commandery had fixed to convene in San Antonio, on the dates originally named for the assembly of the Southwestern. From the programme forwarded by Secretary Stuart it is easily seen that the meeting will have much of interest for gas men; for besides the address of the President—Mr. Thomas D. Miller, of Dallas, Texas—which certainly will have full reference to the gas division of the Association's purposes, we note the following papers on topics of much concern to gas men: "Electrolysis," by Mr. E. H. Jenkins, of San Antonio; "Operation of Corporations from a Business Standpoint," by Mr. A. E. Judge, Tyler, Texas; "Electricity vs. Gas for Lighting Purposes," by Mr. J. F. Cullinane, Dennison, Texas; and "The Attitude of Municipal Corporations to the Public," by Mr. John G. Boyd, Terrell, Texas. Several other papers, on topics relating to electric lighting and street railway operation are listed. A good scheme of entertainment has been planned. The headquarters of the Association will be in the State House, and Secretary Stuart holds himself in readiness to attend in advance to the wants of those who propose being present at the meeting.

NOTES.—Mr. Daniel R. Russell, Vice President of the Parker-Russell Mining and Manufacturing Company, of St. Louis, Mo., was in New York last week. When asked how the feeling was over the state of trade, as determined by him in the course of his journeyings through the country, he replied, "Excellent, as may perhaps partly be shown by the orders for new benches and renewals for old ones on our books." Asked for a list of the work in hand, he gave the following enumeration: Akron, O., 4 benches of 6's; Cincinnati, 50 benches of 8's; Cleveland, 12 benches of 8's; Indianapolis, 10 benches of 6's; Laclede Co., St. Louis, 44 benches of 6's; Lynchburg, Va., 6 benches of 6's—the contract at Lynchburg also calls for the complete reconstruction of the generating plant; Moline, Ills., 2 benches of 6's; Minneapolis, Minn., 14 benches of 9's; Norfolk, Va., 4 benches of 6's; Racine, Wis., 10 benches of 6's; Winston-Salem, N. C., 3 benches. Which list goes to show that the gas men are putting their houses in order.——The proprietors of the Scranton (Pa.) Gas and Water Company have purchased the rights heretofore owned by the Providence (Pa.) Gas and Water Company. For several years the latter has been supplied by the former. In fact Providence is really a part of the city of Scranton.——The offices of the Safety Gas Main Stopper Company have been removed to 1790 Park avenue, city.——A correspondent incloses the following: "The proposition which the Birmingham (Ala.) Gas Company has made to the city as a basis for a new contract embraces a period of 50 years, the right to extend mains to new territory as from time to time acquired, and the following terms for gas: On cooking, heating and power account, $1 per 1,000; on illuminating account from April 1, 1900 to April 1, 1910, $1.50 per 1,000 cubic feet; for next 10 years, $1.40; next 10 years, $1.30; next 10 years, $1.20; last 10 years, $1.10. The ruling rates are: Fuel gas, $1; illuminating gas, $1.65, less 10 cents for prompt payment.——The last dividend by the Providence (R. I.) Gas Company of $1 per share, is payable to-day.——The annual reunion of the Engineers and Superintendents connected with the United Gas Improvement Company was successfully completed March 22d. The sessions, which lasted three days, were held in the Company's handsome office building, Broad and Arch streets, Philadelphia. The main social feature of the convention was a "smoker" at the Hotel Walton, the night of the 22d, during the continuance of which the U. G. I. Glee Club was very much in evidence. The convention is said to have been an exceptionally interesting one from a technical standpoint.——A correspondent who writes that a man named Clark was convicted some days ago in West Superior, Wis., of having opened the money boxes of several prepayment meters and appropriating the contents thereof, says that Judge Smith sentenced the culprit to a three-year term in the Wisconsin State Prison.

Obituary Note.—Mr. Gustavus E. Wetherbee.

At the last meeting of the New England Association of Gas Engineers, President Addicks appointed Messrs. J. A. Gould, Charles F. Spaulding and William Anderson a special committee to prepare a note or minute, for spreading on the Association's records, to the work and memory of Mr. Gustavus E. Wetherbee, whose death had been reported by the President to the Association in his address. The committee experienced some delay in collecting the facts connected with their labors, preferring that the minute should be consecutive rather than disjointed. That the work was well done is shown in the following concise history of Mr. Wetherbee's life, submitted to Secretary Gifford, March 24th:

To the Members of the New England Association of Gas Engineers: Gustavus E. Wetherbee, a member of the New England Association of Gas Engineers, died at his home in Roxbury, Mass., June 10, 1899.

Mr. Wetherbee had been engaged in the gas business for over 30 years, having been connected successively with the following gas companies: Newton and Watertown, Mass., from 1860 to 1862, when he enlisted with the 44th Massachusetts Volunteers; Boston Company, from 1868 to 1875; Jamaica Plain, 1875 to 1878; Roxbury, 1878 to 1884; Boston Company (Commercial Point works), 1884 to 1887; Worcester (Mass.) Company, 1887 to 1897. He was Superintendent of the latter Company for 10 years, when, after a season of continued ill-health, he was obliged to give up this position and go South. In February, 1898, he again became connected with the Roxbury Company, taking direct charge of the distribution systems of the Roxbury and Brookline Companies in the Roxbury district. He may truly be said to have died in harness, as he was in his office until 10 o'clock of the forenoon of the day he died.

Mr. Wetherbee was married in November, 1874, to Miss Louisa B. Balcom, of Eastport, Me., who, with two daughters, survives him.

He was highly esteemed by all who knew him, and in his death the Association loses a kind, generous and true hearted member.

J. A. GOULD,
CHAS. F. SPAULDING,
WILLIAM ANDERSON, } Committee.

PROCEEDINGS, SIXTEENTH ANNUAL MEETING, OHIO GAS LIGHT ASSOCIATION.

HELD IN CONVENTION HALL, CHITTENDEN HOTEL, COLUMBUS, OHIO, MARCH 21 and 22, 1900.

FIRST DAY, MARCH 21—MORNING SESSION.

The Ohio Gas Light Association was convened in 16th annual session, at 10 A.M. of March 21st, by the President, Mr. A. P. Lathrop, the meeting room being the Convention Hall of the Chittenden Hotel, Columbus, Ohio.

ROLL CALL.

The roll call disclosed the presence of the following members:

Allen, G. A.	Gwynn, J. W.	McLain, C. M.
Andrews, C. W.	Harper, H. D.	Olds, H. L.
Alcott, F. L.	Harris, J. A.	Osius, G.
Barnes, G. W.	Hayward, S. F.	Penn, Jerome
Beam, F. L.	Hedges, W. C.	Perkins, B. W.
Booth, M.	Henderson, E. H.	Persons, F. R.
Boyle, W. C.	Hickenlooper, A.	Phillip, E. B.
Butterworth, I.	Johnson, E. D.	Printz, E.
Byers, C. A.	Johnston, J. O.	Ritter, C. S.
Canterbury, J. P.	Jones, T. C.	Roper, G. D.
Chollar, B. E.	Kauke, J. H.	Russell, D. R.
Clapp, G. N.	Kerlin, R. G.	Sapp, D. E.
Clark, J. J.	Kerlin, E. M.	Schmidt, E. G.
Cline, J. W. R.	Kirby, H. C.	Seamon, J. F.
Coombs, M.	Knight, W. H.	Sharp, W. G.
Coombs, F. S.	LaKamp, H. J.	Smart, G. M.
Corbus, F. G.	Landon, H. McK.	Spinning, D. C.
Cressler, A. D.	Lathrop, A. P.	Stacey, F. A.
Critchlow, E. C.	Langforth, F. A.	Stacey, J. E.
Critchfield, C. V.	Light, G.	Stacey, A. J.
Dangler, D. E.	Lloyd, E. F.	Stacey, W.
Davidson, J.	Lomax, C. S.	Stephens, J. G.
Dawes, B. G.	Lynn, J. R.	Stone, F. W.
Dell, J.	Lynn, J. T.	Swartz, H.
Dickey, R. R.	Leckey, N. G.	Tayler, G. H.
Dixon, W. R.	Mallon, N. B.	Thompson, H. G.
Doherty, H. L.	Many, F. B.	Trenkamp, H. J.
Edgar, G. B.	Mason, C. T.	Turney, H. D.
Eysenbach, E. E.	Mason, J. T.	Walters, J.
Faben, C. R., Jr.,	Maxon, J. H.	Warren, E. C.
Foster, B. P.	Mayers, J. A.	Welch, C. H.
Franklin, John	Mills, J.	Wells, F. K.
Gassett, A. L.	Miner, J. R.	Wells, L. W.
George, W. B.	Montgomery, R.	Wehle, E. H.
Gillette, M. M.	McCook, G. W.	Whysall, G.
Gregory, J. M.	McDonald, D.	Wickham, L.
Greenough, M. S.	McDonald, D.	Wilkiemeyer, H.
Gribbel, W. S.	McElroy, B. L.	Wones, W. R.
Guenther, C. M.	McIlhenny, J. D.	Yawger, E.
Guldlin, O. N.		

The President introduced the Hon. George K. Nash, Governor of Ohio, who delivered the following

ADDRESS OF WELCOME.

Mr. President and Gentlemen—It gives me very great pleasure to meet with you to day and to welcome you to the capital of the State. One reason why I am glad you are here is because I believe the gentlemen connected with the gas companies of Ohio realize that people have the right to find all the fault they wish, and that you are accustomed to such sort of thing. I remember a few years ago I did a good deal of grumbling for about six months regarding the quality of gas furnished in my house. Finally a friend who came to my house one evening suggested that possibly if I put on a pair of glasses I would find the quality of the gas was improved. (Laughter and applause.) I realize the fact that many of the faults which are found in your business have just about as much foundation in fact as the grumbling which I did because of what I supposed was the poor quality of gas which was being furnished. I understand that the object of this meeting is the purpose of coming together to discuss ways and means of cheapening the product which you furnish to the public. In that way you are certainly doing a great service to the people of Ohio, for the greater economy you can devise for the production of gas enables you, not only to furnish a better quality of gas for the citizens of Ohio, but also to give them the benefit of the cheaper modes of manufacture. This is certainly a very laudable purpose. I am glad, meeting for such a laudable purpose, that you have selected my home city as the place for holding this your sixteenth annual meeting, and I hope while you are in Columbus you will not only find your meeting profitable to yourselves and profitable to those with whom you deal, but that you will also find it pleasant and agreeable, and that you will go to your homes feeling entirely satisfied with the reception which you have been accorded in Columbus, and also satisfied that you have done your

own work some good by the consideration which you have given it. Again, I welcome you to the city, and thank you for the attention which you have given me. (Renewed applause.)

The President—Ex-Governor Bushnell had expected to be able to reply to the address of welcome just delivered by Gov. Nash; but, having been called out of the State, he is unable to be present. Mr. Montgomery, of Youngstown, has kindly offered to take his place. On behalf of Association I have the pleasure of presenting to you Hon. R. Montgomery, of Youngstown, Ohio, who will respond to the cordial welcome so generously extended by Governor Nash (Applause).

Mr. Montgomery, of Youngstown, Ohio, delivered the following

RESPONSE TO THE WELCOMING ADDRESS:

Mr. President, Governor Nash and Gentlemen—I fear an injustice has been done in selecting me, a new member of this Association, to respond to the very kind words of welcome which have just been expressed by our distinguished Governor. It is hardly true that I have consented to reply; but as I have been called upon, in a very few words I will express the cordial feeling of the members of this Association for the generous welcome extended by the gentleman who just addressed us. The work of this Association is entirely new to me; but, as outlined by the Governor, I feel it is a good work, and that the men in this State engaged in gas lighting supply should get together, as they have been doing, to take an interest in this our industry. I want to thank the Governor for his welcome, and to promise for the members of this Association that their conduct while in Columbus shall be such as will meet with his approval. There are, however, a number here not of our State for whom I can hardly vouch, not knowing them; and I would, therefore, advise the Governor to have the National Guard on waiting orders so that they can be attended to should they break the rules of propriety. I thank you, Mr. President, for the honor bestowed in calling upon me to respond to this address of welcome. In conclusion I can only say we thank the Governor of our State for his kindly welcome, and that the cordiality of his greeting is only equalled by our pleasure and appreciation (Applause).

The reading of the minutes of the last meeting having been dispensed with, the President called for the

REPORT OF THE EXECUTIVE COMMITTEE

which was read by the Secretary.

To the Members of the Ohio Gas Light Association: Your Executive Committee beg leave to submit for your consideration the following recommendations and report:

1. That Messrs. Charles R. Faben, Jr., Irvin Butterworth and Moses Coombs be appointed a Nominating Committee.

2. That Messrs. Eugene Printz, Frank B. Kehoe and Jerome Penn be appointed a Committee on Memorial.

3. That Messrs. George Light, J. W. R. Cline and E. E. Eysenbach be appointed a Committee on Next Place of Meeting.

4. That Messrs. C. H. Cole, Hugh McCall, A. K. Stephens, F. A. Randle, W. P. Bonney, R. S. P. Lowry, W. A. Luce, J. B. Fisher and E. C. Gywn be released from membership at their own request.

5. That Messrs. J. J. Clark and W. G. Bissell be dropped from membership for non-payment of dues.

6. That the following be elected to active membership: Messrs. F. L. Alcott, Gen. Mgr. and Secretary, The Standard Lighting Company, Cleveland, O.; W. T. Barbour, Pres. Detroit (Mich.) Stove Works; Frank L. Beam, Director, Coshocton Light Fuel and Power Co., Hillsboro Light Fuel and Power Co., Mt. Vernon, O.; W. V. Coons, Sec. and Treas., City Gas Light and Heating Co., Findlay, O., Pres. People's Gas and Electric Company, Defiance, O.; F. G. Corbus, Mgr., Incandescent Trading Company, Cleveland, O.; Fred. S. Coombs, Supt., Meter Department, Youngstown (O.) Gas and Electric Co.; Chas. V. Critchfield, Sec. and Treas., Hillsboro (O.) Light and Fuel Co.; W. R. Dixon, Sec. and Treas., Coshocton (O.) Light, Fuel and Power Co.; J. O. Johnston, Supt., Central Ohio Natural Gas and Fuel Co., Columbus, O.; R. G. Kerlin, President Tiffin (O.) Light and Fuel Co., Toledo, O.; E. M. Kerlin, Sec., Tiffin (O.) Light and Fuel Co., Toledo, O.; H. C. Kirby, The Goff-Kirby Coal Co., Cleveland, O.; Hugh McK. Landon, Secretary Manufacturers' Natural Gas Co., Indianapolis, Ind.; Frank A. Langforth, Engineer, New Haven Novelty Machine Co., New Haven, Conn.; J. T. Lynn, Pres. Portsmouth (O.) Gas Co., Detroit, Mich.; Nathan G. Leckey, Asst. Sec. Michigan Ammonia Works, Detroit, Mich.; B. L. McElroy, President Hillsboro Light and Fuel Co., Mt. Vernon, O.; Neil B. Malon, Treas. and Gen. Mgr., Newark (O.) Gas Light and Coke Company; C. T. Mason, with Geo. M. Clark & Co., Chicago, Ill.; J. T. Mason, Asst. Supt., Columbus (O.) Gas Company; Albert V. Morreau, President Morreau Gas Fixture Mfg. Co., Cleveland, O.; H. L. Olds, Supt. City of Lincoln (Ill.) Gas Company; B. W. Perkins, Supt. South Bend (Ind.) Fuel and Gas Co.; Chas. S. Ritter, Sec. Columbus (O.) Gas Company; D. E. Sapp, Direc. Coshocton Light, Fuel and Power Co., Hillsboro Light, Fuel and Power Co., Mt. Vernon, O.; Wm. G. Sharp, Pres. Elyria (O.) Gas and Electric Co.; A. J. Stacey, Stacey Mfg. Co., Cincinnati, O.; Chas. F. Terhune, Vice-Pres. Wm. M. Crane Co., N. Y. City; H. Grant Thompson, Pres. New Haven (Conn.) Novelty Machine Co.; H. D. Turney, Direc. Columbus Gas Light and Heating Co., N. Y. City; Edwin H. Wehle, Gen. Mgr., Monarch Water Heater Co., Pittsburgh, Pa.; Edwin Yawger, Westinghouse, Church, Kerr & Co., Pittsburgh, Pa.; Peter Young, Sec. and Treas. Conneaut Gas and Fuel Co., Detroit, Mich.

On motion, the report of the Executive Committee was adopted and ordered spread upon the minutes of the Association.

ELECTION OF NEW MEMBERS.

On motion of Mr. C. W. Andrews, the Secretary cast the ballot of the Association for the election to membership in the Association of the applicants recommended by the Executive Committee.

The Secretary having reported the carrying out of the instructions, the President said he hoped the gentlemen just elected to membership in the Association would feel as free to take active part in its proceedings as if they were old-time members.

REPORT OF SECRETARY AND TREASURER.

Secretary and Treasurer Jones then submitted his annual reports, which covered the period between March 16, 1899, and March 21, 1900. As Secretary he reported that the rolls showed a membership of 205, of which 13 were honorary and 192 active, and that 4 membership badges were on hand. As Treasurer, his returns showed a total receipt (including balance from previous year) of $1,013.23. The expenditures for the time named left a balance of $342.86 on hand. The reports, which were certified to by the Finance Committee, were, on motion, received and ordered spread on the minutes.

LETTERS OF REGRET.

The Secretary acknowledged the receipt of many letters regretting that time, distance and prior engagements of the writers prevented them from attending in person the convention. Other official communications of this nature forwarded are appended:

NEW BEDFORD, MASS., March 13, 1900.

Mr. T. C. JONES, Sec'y Ohio Gas Light Association:

Dear Sir: At the Thirtieth Annual Meeting of this Association it was voted that the Ohio's invitation to its Sixteenth Annual Meeting be accepted by so many as can go. I thank you kindly for your invitation to me personally just received, and regret that I shall be unable to accept. Wishing you a successful meeting, I am, Very truly,

N. W. GIFFORD,
Sec. New England Association of Gas Engineers.

NEW ALBANY, IND., March 18, 1900.

Mr. T. C. Jones, Secretary Chio Gas Light Association: Dear Sir—I am greatly disappointed in not being able to attend the 16th annual meeting of the Ohio Gas Light Association. I congratulate you on your excellent programme prepared, and wish, and am sure you will have, a most profitable and pleasant meeting. Extend to the members of the Ohio Gas Light Association a cordial invitation to be present at the Western meeting, in Chicago, May 16-17-18. With best wishes for the success of your meeting, I remain, sincerely yours,

JAMES W. DUNBAR, Sec. Western Gas Association.

NEW YORK CITY, March 14, 1900.

Mr. T. C. Jones, Secretary Ohio Gas Light Association: Dear Sir—The invitation to be present at the 16th annual meeting of the Ohio Association has been duly received. I regret that for the next two weeks I will be so busy with this work of the Class that I will be unable to leave New York to attend the meeting. Hoping that you will have a successful meeting, I remain, yours truly,

ALFRED E. FORSTALL, Sec. American Gas Light Association.

SAN FRANCISCO, March 16, 1900.

Mr. T. C. Jones, Secretary Ohio Gas Light Association: Dear Sir—I am sorry that distance makes it impossible for me to attend the sixteenth annual meeting of the Ohio Gas Light Association. The Pacific Coast Gas Association joins with me in wishing you a most successful meeting. Yours truly,

J. B. GRIMWOOD,
Sec. Pacific Coast Gas Association.

AN INVITATION.

The President then said that the United States Cast Iron Pipe and

Foundry Company, the Columbus Gas Company, the Central Ohio Natural Gas and Fuel Company and the Federal Gas Company, all of Columbus, O., extended to the members and their guests a cordial invitation to attend the performance at the Great Southern Theater that evening.

President Lathrop then read the

ANNUAL ADDRESS.

[For President Lathrop's Address, see JOURNAL, March 26, page 489.]

COMMITTEE ON PRESIDENT'S ADDRESS.

On motion of Mr. Butterworth, President Lathrop's address was referred to a committee of three for consideration and report. The Secretary, upon whom was placed the naming of the committee, appointed Messrs. G. A. Allen, J. H. Maxon and Fred. R. Persons.

The President introduced Mr. Fred. R. Persons, of Toledo, O., who read the following paper on

GAS APPLIANCE EXCHANGES.

The question of sales department is to day the most important branch of business for consideration of the directors of every gas company. In this day of improved apparatus for generating, cleaning and purifying gas, finely educated and skillfully trained engineers, the management of a gas company need only look at their reports each morning to know that they are obtaining high efficiency from material used and labor performed.

It matters not how cheap gas can be put in the holder, or to what small percentage the leakage account may be reduced, it is profitless unless the merchandizing end of the business is up-to-date. The increased sale of gas depends upon the number of ranges and other apparatus you are able to put on the market and secure a patronage for. Gas companies now fully realize that the increase in business must come from the day rather than the night consumption. Gas companies acting as merchants have been successful up to a certain point in placing appliances with the consumer.

Hardware and stove dealers are of benefit to the sales department of the gas business when they have been sufficiently subsidized, and particularly so when there is more profit in selling a gas range than in selling a gasoline, wood or coal stove. The probable effect of a gas appliance exchange on the average stove dealer would be to spur him up. When he realizes for the first time that he has a competitor who is making a specialty of one branch of his business, it is most natural for him to cut prices and advertise largely, hoping to drive this competition out of the business. This same competition cannot help but result in permanent advantage to the local gas company, and largely increase its list of consumers.

Then, again, the effect of a gas appliance exchange might be to antagonize the dealer to the extent that he would drop gas appliances entirely, and attempt to fight the real object of the exchange by the sale of gasoline stoves, etc., etc.

The extreme high price of gasoline today and the reduced price of gas for fuel purposes preclude this possibility, however. The entire object of a gas appliance exchange would be, of course, to sell any and every gas consuming device that may be applied to the use of illuminating gas for the purposes of either lighting or heating.

When one considers the vast number of appliances on the market today it is very easy to see why this business should be divorced from the gas business proper.

The business of selling gas appliances by and under the direct management is most apt to result in disaster unless much real energy be maintained. In the maze and multiplicity of duties devolving upon office employees in the average situation, the "sales department" for gas appliances will likely be sidetracked, so to speak, if indeed not entirely neglected, and possibly to the benefit of some other department of the gas business, which in itself may be of much less real importance.

Experience has established the fact that a gas range may be sold at a moderate price to better advantage than to give it away. The man who has his range free is very apt to lose interest in it, and also in the use of gas.

A gas appliance exchange must have plenty of encouragement from the gas company for the first few years. It starts as an infant industry and must have a high tariff to protect it. The degree of success to be hoped for may be measured very closely by the amount of interest, zeal and lively co-operation manifested by the local gas company.

There is scarcely a city in this country where gas appliance exchanges cannot be made to show a direct profit from the business venture in itself, in the course of a few years. We are drifting toward specialists in all branches of business and in every profession. In the average situation the business can be conducted cheaper and more accomplished after a certain stage has been attained than to be continued by the gas company.

The price of good illuminating gas for both domestic and industrial purposes is reaching the minimum point very fast. There is no chance for any advance in the selling price at any future time. Therefore, managements who are not pushing this department by offering every inducement and encouragement for an increased gas consumption are remiss in the matter of a most important duty. It ought to be sufficient to remind such management that now is the accepted time to take hold, and assist by way of defraying at least a portion of the expenses of installing gas consuming devices among their patrons, and as far as practicable enlarging their list of consumers. It is important that the work be done now, for never in the future experiences of gas companies will they be enabled to secure prices for all their products equal to the prices current at this time.

The wiser ones will surely take advantage of the present situation, and by largely increasing the uses to which gas may be applied in their local situation, and by securing suitable installment of useful and desirable gas consuming devices, and increasing their list of gas consumers up to the maximum in number, will thus fortify themselves against the day and time when they, by force of circumstances, will be compelled to meet further reduction in selling rate.

Discussion.

The President—This very interesting paper is now before you for discussion. I hope everybody will feel at liberty to discuss it, criticize it and ask questions with reference to it. We want a full and thorough discussion of all subjects before the convention. We all know what a good thing a gas stove is for both the consumer and the company. How best to get them in use has been a question of considerable discussion at our meetings. As Mr. Doherty, of Madison, Wisconsin, has had a good deal of experience in pushing the gas stove industry we would now like to hear from him on the subject.

Mr. Doherty—Being somewhat out of the business of actively pushing gas stoves at present, and as I have talked a good deal on this subject at previous meetings of this Association, I would prefer to hear from somebody else.

The President—Any man who has good ideas ought to give the members of the Association the benefit of them. Mr. Olds, as you are pushing the gas appliance business pretty hard just now, we would like to hear from you.

Mr. Olds—As I have only had eight months' experience in pushing the gas stove feature of the business I cannot speak from as lengthy an experience as can others present. I follow the plan of selling stoves on long time, connecting them free of charge and selling them at cost. The gas stove industry in our city had not been pushed very extensively when I assumed charge of our Company. Last year we met with what we considered very good success. How we are doing this year I cannot say. We operate under the Company entirely. I am told that at Springfield, Illinois, they give away a gas stove with $3 worth of gas.

General Andrew Hickenlooper, having been called upon by the President to present his views upon the question under discussion, spoke as follows:

I am decidedly in favor of the establishment of the gas appliance exchange. So far as my own ideas regarding the promotion of the peculiar feature of our industry are concerned, I can only say that it is a law unto itself, and the course to be determined upon must have reference to one peculiar locality, and should be in harmony with the views and associations existing in that special community. A great deal of credit has been attached to, and a great deal of self laudation indulged in, by representatives of the several gas companies recently who point with pride to phenomenal growth of this feature of our industry by reason of their efforts in promoting the use of gas stoves. I always hate to call the gentlemen down who have been so eminently satisfied in the accomplishment of this purpose, but I might say by way of criticism that I think they have only become awakened to the conditions existing at a time where others are about ready to lead off. I so far as the measures adopted by companies for the gratuitous giving away of gas stoves, or contributing services, are concerned, it is a perfectly proper method in the inception of the establishment of gas stoves, but I do not believe in the continued contributions by a gas company in furnishing appliances for the consumption of their product. Rather do I think that they ought to make contributions in the shape of a reduced price in that product. The promotion of a system for the control of procedure in that matter, as far as the city of Cincinnati is concerned

began before a gas stove had been made in the United States. They imported from France and Germany and other European countries the best forms of gas stove obtainable, and then improved upon it as was in the judgment of their subordinates to the best interests of the consumer. And they manufactured and sent out those gas stoves through an established agency, not under the known patronage of the gas company, but a gas appliance store. It was very methodically worked up. A very competent instructress was employed. Furnished with a coupé, a fine dress and calling cards, she was sent around to promote the use of gas stoves. It was a very small beginning. The policy in pursuing this mode of promotion was based upon the fact that I had such a reputation for being a "gas liar" that no one in Cincinnati would believe anything that I had to say upon the subject. But in a family, where a gas stove was in use, this instructress would call, present her card with as much ceremony as possible, the purpose and object being to secure an interview with the lady of the house, and that she might not be taken for a common tramp or a book agent. This graceful and agreeable woman would inquire about the house owner's success in operating the gas stove. The lady would reply that she had experienced some difficulty in the workings of the stove, that the biscuits would not bake on the bottom. Much to her surprise the instructress would say, "Madame, if you will be kind enough to appoint an hour I will cook your biscuits on the bottom for you." The appointment would be made and she would then inquire very graciously whether there were any others in the neighborhood who were talking about getting gas stoves, and would be told, "Mrs. Jones over here, and Mrs. Smith over there." Immediately calling upon them the same performance was gone through. We found difficulty in establishing the fact of the great economy in the introduction of fuel gas for domestic purposes, until by such means we awakened sufficient interest among the ladies of the city so that Mrs. Jones would tell Mrs. Smith, and Mrs. Smith would inform Mrs. Brown, and so it would go the rounds until now it has become firmly established in Cincinnati, so that I can safely say that 90 per cent. of the consumers of our Company are supplied with gas stoves. We also endeavored to promote the introduction of stoves by agreeing to set the stoves free of charge. We arranged with the different dealers so that all they had to do was to sell the stove and send it to the residence of the consumer, and then transmit to us a card, the form of which was something like this: "We have this day sold a certain sized stove, with a certain sized connection, which will be delivered at a certain number, on a certain street, at a certain time, and you are requested to set it." Under the direction of the superintendent of distribution our men would be at the place indicated at the time stated and would set the stove free of charge. But owing to the phenomenal reduction in the price of gas used for fuel purposes in Cincinnati we have felt that we could not longer furnish gas for nothing and throw in our services free of charge, so we have recalled that order. It was also inspired somewhat through the representations made by the Gas Fitters' Association of Cincinnati that, by doing this work, we would deprive them of a business which justly belonged to them, and that it was to our interest to promote the gas fitting industry as well as promote the sale of gas, and that by relinquishing the setting of stoves free of charge we would throw that work into their hands, and that each of the 40 or 50 gas fitters in Cincinnati would become an agent for the sale of stoves and the promotion of the gas industry in that line, and that now is the system prevailing in our city. We have nothing to do with the setting of stoves or the sale of the stoves or anything in connection with that particular feature of it. But we will gladly do anything we possibly can in reference to assisting any one who is disposed to undertake the risk and assume the responsibility of establishing Gas Appliance Exchanges. (Applause.)

The President—Certainly others here must have had much experience on this subject that would be valuable to us. Mr. Malone, will you relate to us your experience in this regard?

Mr. Malone—We have been very successful at Madison, Wis., in the introduction of stoves. I think the query of how to manage the gas stove business is a good deal like the query of how the wife should manage the husband, which was answered, "Feed him well, and then trust to luck." Having advertised and pushed the thing actively, after the first year or two we found no difficulty in getting the people to "catch on." We made a personal canvas from house-to-house and have made data, as accurate as possible, of the entire city, giving the name of the occupant, each residence, whether it is piped for gas, and other points of information which may be of use as future reference. We revise that list every year so as to make it as accurate as possible with reference to existing conditions. I would suggest that by a systematic effort, personal solicitation and plenty of advertising, very good results can be accomplished in the way of securing consumers to use gas appliances for cooking. For our own convenience we have divided our city of about 18,000 inhabitants into four parts, and we generally keep four men pretty busy for about 7½ months of each year.

Mr. Brown—I would like to hear from Mr. Malone as to that 4th of July parade with gas stoves which took place in his city.

Mr. Malone—The 4th of July that time happened to be circus day, which was the 29th of May. We conceived the idea of following the circus parade with a display of gas stoves. We had 13 wagons in line decorated with American flags and loaded down with gas stoves, which followed the circus parade all over town. These wagons were accompanied by a drum corps, and with the decorations and noise of the drum corps we succeeded in attracting about as much attention as did the circus.

Gen. Hickenlooper—Mr. Chairman, if you will permit me to suggest in a general way, I regret the indisposition of members not to step to the front in the discussion of questions of this kind, although I am free to admit that this indisposition arises from the natural and well known modesty of the gas man. (Laughter). It appears to me the greatest benefit to be derived from the meetings of this Association is the individual experiences and ideas of the members expressed in a discussion of these practical subjects. It is a very easy matter to read a paper, prepared in advance, setting forth the views of the writer, but it possesses comparatively little value as compared with the individual experiences and criticisms of the various members of this Association, giving the facts from actual experiment and observation. I therefore regret to see the members in their over-modesty sit quietly by and wait to be urged to speak upon a subject of this kind. I think it is the duty of every member to tell what he knows upon any particular subject presented for the consideration of the Association.

The President—I heartily agree with what Gen. Hickenlooper has just said, and I hope there will be less of this well known modesty exhibited during the rest of the session at least. The Chair will expect to hear from all of you when individual experiences are to be given in the discussion of the practical topics brought before the Association.

Mr. F.W. Stone—Mr. Chairman, the trouble with many of us is we come here feeling that we know something, then somebody else talks upon a given subject, after which we realize that the gentleman who has spoken knows so much more about the subject under investigation than we do that we begin to feel that we do not know anything about it at all. With reference to our individual experience in the gas stove business I can say we have been successful. We have not been able to offer any particular inducements, but have relied mainly upon advertising the business and soliciting trade in that line. A canvasser goes out every spring. We make out a list or record each year of all the houses on a given street, and take them up one by one. Those whom we do not get this year we try for next year. We try to manage the business in a way not to antagonize the hardware dealers or the plumbers in our town. We would rather have them our friends than our enemies, and I can say they have rendered valuable assistance to the Gas Company. Starting the business we said to them, "Now, if you sell a gas stove we will give a rebate in gas of 20 per cent. as an inducement to the customer to buy a gas stove." In that way we endeavored to bring the cost to the user of the gas stove down to the actual cost of the stove. For instance, if a consumer pays $25 for a stove we give a rebate of $5 worth of gas to him, outside of which we make no other inducements. We endeavor to increase our trade by canvassing, personal solicitation and advertising. We do not feel that we can afford to make free connections, although under other conditions we might be justified in so doing.

Mr. E. B. Philipp—The reason that a majority of the modest members of the Association prefer to listen rather than to talk, as has been suggested by Gen. Hickenlooper, is, I think, due to the fact that none of us, no matter what our experience has been, feel competent to suggest any positive plan for increasing our consumption along the line spoken of; but as Gen. Hickenlooper and President Lathrop have very kindly invited us all to give our individual experiences, possibly the few words I may say may be of some interest, although not of much help, to the members of this Association. In 1876 I was the superintendent of a gas plant in a town of 4,000 inhabitants, at which time we received better prices for gas than we do now. The rate then was $4 per 1,000. The plant was a good one, which had just been installed. Our consumption was very limited as far as the amount was concerned, and we had to work up the business right from the ground. Four dollars per 1,000 was not a very good prospect for securing much consumption, considering the price of coal, even at the price at which it

sold at that time. We succeeded in getting some consumers and then commenced to pay attention to the use of gas for cooking purposes. In those times the gas stove was a new thing. The few we had in this country were copies of those manufactured in Europe, and they were not up to date; but I found from experience that in this department, as well as in all other departments of the business, the only keynote to success was personal, hard application to the details of the business. Starting with none in use, in a little town of 4,000 inhabitants, in two years' time 300 stoves were in use. We bought the cheapest stoves we could, because our means were limited, and sold them at a nominal price to make the latter an object as far as possible for the consumer to use gas for cooking. I think if we pay particular attention to that department, giving it as much time as we give to the process of manufacture and the disposal of our residuals, or any other branch of our business, we can succeed in making as much progress in this line as we have made along the other lines connected with our business.

Mr. Charles R. Faben, Jr.—I think another reason can be ascribed for the apparent silence of many members in speaking upon such subjects as the one now under discussion. The idea of the practical manager is not always in accord with the moneyed end of the gas company, and if he is not at liberty to express his ideas and his experiences the result is that he does not express them. He simply cherishes them as a dream. I notice as a matter of comparison, if you take, for instance, the electric light or street railway companies coming into a town, when they have been reorganized, when the old owners relinquished their holdings and the new owners came in and paid a good, round price for a streak of rust and other contraptions, they had unlimited means which they spent. And, without enlarging on the subject, but to bring it down to the gas business, it may be said as a true proposition that if a gas company could install a stove for $30, we will say 1,000 of them would represent an investment of $30,000 and they would doubtless show gross earnings of at least $30,000 a year. Now, why is it not that good business? Yet how many companies are there who prize it? A great many companies do prize it, but they are not saying anything about it. It is that sort of narrow management with reference to money expenditures which prevents many gas companies from availing themselves of all the opportunities at their command. They think if the expenditure is not coming out of the earnings above dividends it is a needless expenditure, for it ought not to come from that source. It really ought to be new capital invested. I think the subject should be looked at a good deal more broadly than it is. It should be looked at as an investment in itself. I notice that electric light companies do not stand back when a man has not got the money to wire his house. He does not have to forego the advantages of electricity because of that fact. They do not stand on any hard-and-fast rule occupying the sphere of a *quasi* public corporation which is trying to treat everybody alike. If it is necessary to wire a man's house and give him the lamps they seem to do it. And they do not have any trouble in making inroads in the business of the gas companies which are run according to that hard-and-fast rule. With that maze of conditions existing in many places all over the country, it is not remarkable to my mind that practical managers who come here to attend these meetings do not speak more freely. But I have observed that when they leave this hall and go down stairs to the lobby in communicating with each other they express themselves much more freely. I think the papers presented here and the ideas advanced in the discussions which follow form the basis for individual discussion among the members of the Association. I think they also form a nucleus for bringing the members together, and that the real good of the meetings comes from an interchange of ideas in and about the corridors of the hotel more than in the assembly hall.

Mr. H. L. Doherty—I would like to say a few words which I think are pertinent to the subject under discussion. I have attended most of the gas conventions in the last few years and, at every convention for the last four or five years, the subject of the use of gas for fuel has been discussed. My position on that subject, as those who have talked with me about it know, is that I believe first of all in selling gas, and if necessary let the manufacturing end of the business take care of itself. It does not have to take care of itself, but I believe in devoting the greatest amount of our energies to the sale of gas. One point almost invariably overlooked in these discussions is the taking care of stoves that are already out and in use. Companies in a number of cities have tried giving away gas stoves, services, and the time and labor in making the necessary connections. So far as my position on this subject is concerned I may say I am in favor of getting them to hitch on to the gasholder, no matter how you have to do it, but I do not think it is necessary to give away services or stoves in order to accomplish this result. I tried in one city to demonstrate that fact. One thing that must be attended to, whether you give away gas stoves, furnish free connections, employ solicitors or depend upon advertising, is to make every gas stove in use in your city give entire satisfaction. I was in a town the other day where they had competition at one time. They had given away gas stoves, and a man connected with the company said to me: "We have out so many thousand ranges, but I think that not more than one-half of them are in use. My stove never would work, and we never use it." The criticism I would offer on gas companies is that, having been too anxious to get out stoves, they forgot that the object for which the stoves were put out was to increase the sales of gas. In the company I referred to a few moments before, where I had experimented in selling the stoves and services, and charging more for the services and stoves than they cost, the success of the gas stove feature of the business depended almost entirely on making every stove in use give good satisfaction. Some times we have had to change the stoves two or three times, but in the last four years we have not put out a stove which has not been used unless the people have moved out of the town, or to some point where they could not get gas. Every complaint, whether imaginary or real, must be satisfied. If a consumer imagines that his bill is too high, and you cannot convince him in any other way, then bother him to death in explaining why it is not too high until he is convinced that the bills are reasonable. When a man or a woman thinks about getting a gas stove the first thing he or she will do is to inquire among the neighbors who have had them in use what has been their experience. If five are of the opinion they are good things, and one says they are rather expensive, the one who makes the statement that the use of the gas stove is expensive will have more weight than the five who are satisfied with it. People are afraid of the gas meter. I believe any method of putting out gas stoves, if industriously and intelligently pushed, will be successful, if the stoves in use are made to give satisfaction. I know from personal experience where gas is sold for $1.25 per 1,000 and the complaints carefully looked after, the satisfaction among the consumers is greater than where gas is sold at 80 cents and the stoves are looked after in an indifferent manner and the complaints are unheeded. I think a great deal of energy is wasted in pushing gas stoves, about not knowing where and how to push them. My own methods have been criticised from the standpoint of economy. Some of my friends thought my methods were extravagant, but in one particular town—Madison, Wis.—we keep a list of every house in the city. We know who lives in each house, and if the owner does not live in it we know his address. We know how many houses are on our lines of main, know how big they are, whether they are piped, whether they have services in and what they use for lighting, and whether they have bath rooms, so that we can sell them a hot water heater, if possible. We keep that list constantly revised. We had 1,550 four hole ranges connected up there last fall, and the census of 1895 showed a population of 16,595. We have about one gas stove for every 10 people. The town is badly scattered and a very large proportion of the population we are not able to reach at all. I do not think any of us have even started to sell gas for fuel. I think there is no limit to the amount we can sell, even at the prices of gas now reachable. I know we expect in Madison, without lowering the price of gas, to materially increase our business, and we have not yet had to adopt the policy of giving away stoves. We may. I do not know. I have generally found that people prefer to buy something on the installment plan rather than to have it given to them; on the installment plan, even if they pay only $1 per month, and their bill amounts to $20, you are out very little financially.

The Secretary—I would like to ask Gen. Hickenlooper if he thinks the policy of turning the gas stove business entirely over to the dealer will be as successful in introducing the appliances as it would be if the gas company were behind it?

Gen. Hickenlooper—I can only answer that question by saying that our experience in the new departure has not been of sufficient length of time to enable us to arrive at a correct conclusion as to the respective merits of the two methods. My judgment to day is that the method which has been suggested, so far as our own situation is concerned, is a much better policy than attempting to add to the promotion of the business through our own personal efforts in the way of voluntary contributions. But, bear in mind, gentlemen, the fact that I have already stated that each individual instance must be governed by local conditions. We are to-day selling gas in Cincinnati for fuel purposes at 50 cents per 1,000, and the absurdity of selling gas at at any such price, and then attempting to make contributions equivalent to possibly two or three years' consumption of gas, is to my mind perfectly apparent.

It would be absolutely and utterly impossible to sell gas at such a price and then make the voluntary contributions which have been suggested. You cannot give compensation at both ends of the line. If you give it in the price of the gas you certainly cannot add to that a bonus in the shape of furnishing appliances with which to sell it. (Applause.)

Mr. J. D. McIlhenny—I will relate briefly the experience of a gas company with which I have recently become connected, and which heretofore has not pushed the sale of gas, nor has it been pushed in any way in the town in which the company does business, which is a town of upwards of 30,000 inhabitants. As Gen. Hickenlooper has said the method to be pursued by each company depends upon local conditions and environments, taking into consideration the character of the people and the extent to which gas has already been used and the price at which the gas is sold. We have now commenced a thorough canvass of the entire town, having a complete record made up for each house, stating whether they use gas, whether the house is piped, and other useful information, and wherever the opportunity presents itself we use moral suasion until finally we bring them around to our way of thinking. Our plan of selling gas ranges this season is to sell the range and connect it at just about cost price. We may lose a little—a half a dollar or something of that sort on it—but we endeavor to get back almost the cash outlay. We then offer to sell them on the installment plan—not in installments where the consumer can pay or will pay—and as gas has not been heretofore used much we also say, to satisfy people who are afraid of it, that if after any reasonable length of time—say two or three months—they are not satisfied with the use of the range or with the use of gas for cooking purposes, the range will be taken back and the money refunded. We feel so sure the gas will be satisfactory and the use of the gas stove will prove such a convenience in domestic economy of the household, that we are perfectly safe in submitting such a proposition. If any consumers, after giving it a sufficient trial, should feel that they are not satisfied, then they are only out the actual cost of the gas consumed. Where consumers will not use a range we endeavor to place a hot plate, and say to them we will allow them a proper credit for it if at any later time they want to use a gas range. This city is not very far from a large city where ranges are sold at very low prices and connected free of charge. The average cost will probably be $2 to $3 less than we expect to sell them at, but we are going to make the effort anyhow of endeavoring to establish the business upon a good footing in the way I have indicated. From the thought we have given the subject, based upon such experience as we have had, we think the course adopted will be the better one. We figured the question of giving away ranges at a great sacrifice, and of the possible number that we could place by such a method, and we have figured upon the number of ranges that we could place by what might be said to be a fairly businesslike method, and in the estimate or calculation there was not a very much greater number which we could count upon placing by the first method in comparison with the second method suggested. In other words, we have concluded we would rather spend an extra amount of money in additional canvassing and soliciting than by spending the money on gas ranges to be given away. We believe the consumer will value the article more if we follow the plan which I have suggested, and that as a business proposition it was the proper course to pursue, even if at any time in the future the price of the range had to be increased.

The President—I think Mr. Faben struck the keynote when he said it was simply a question with the company as to which way it could make the most money. If by giving away $3,000 worth of stoves you could make a gross profit in one year of $30,000, or by spending that amount of money you could make a corresponding amount of money by the amount of gas consumed, it would be good policy to invest the money in that way.

Mr. McIlhenny—As has been suggested by Gen. Hickenlooper, I think it all depends upon circumstances and local conditions. Take a town where the people are very conservative, where there is a new management and they do not know them sufficiently to entirely have confidence in them, in such a case unless you actually give away the entire thing people will not take them. I do not say under some circumstances that that is not the best plan. The only question is which plan will secure the best results? I know in this particular community to which I have referred, even if we gave away ranges we could not give away any very great proportion more than we could sell, because people are afraid chiefly of the cost of the gas. They look principally at the cost of the gas and at its use for that particular purpose. I would still say, as Mr. Faben has said, that the company should be governed by the circumstances which confront it, and anything that will pay the best is the policy to be pursued. No doubt about that whatever. It is simply a question as to local conditions and environments and what will pay the best under the given conditions of the particular case.

Mr. Faben—Perhaps I did not make myself fully understood. Those who have been in the gas business a long time, as Mr. Philipp indicated, know that gas was sold in former years at a very high price, but finally concessions were made as to the matter of price. Some corporations for instance which, under the old system of high prices, were taking in a given amount of money, are not taking in materially any more money to-day, yet they are dividing more money. The cost of the manufacture of gas has been reduced very largely by having a larger divisor. In a spirit of philanthropy, we may call it, they began to cut down the charges. I know of a great many gas companies where the only record they had of their services was only such as was sufficient to base a charge for putting in the service. They had no other record. Finally, in place of making a fixed charge they let the charge per foot remain the same, but discounted the number of feet, and at last got down to the point of putting in the service at a price not to exceed a fixed amount. We all remember when they used to charge a meter rent for meters at the end of the year. If a man had not used some fixed amount a bill was sent to him for the difference; $3 a year or something of that kind. But all of these little charges have been cut off. The charge for meter connections has been cut off. Now a great many companies make their own connections and put the meter on without any charge other than a sufficient guaranty to cover the cost of gas. My idea was, if they can expend the money, to lay mains in the sparsely settled districts and lay services and connections and furnish a meter—they furnish that much now. I made an analysis of the business of our Company at one time (I will have to speak simply from recollection) and found that more than 20 per cent. of our entire list of consumers were consumers whose bills were averaging 30 cents per month, or $3.60 per year. Something like 20 per cent. on our list had bills that amounted to less than $1. No bill was more than $1 or less than 50 cents, making an average of about 70 cents. And we took in about 20 per cent. more, making 40 per cent. of our consumers who probably averaged somewhere about 50 cents per month. I will not attempt to follow that out any further, but I inverted those figures and found that 90 per cent. of the gas sold was used by 10 per cent. of our list of consumers. Now the consumer who uses gas for fuel will have a bill which will average considerably above his light bill. The service and the meter are there, and if he is going to get a differential rate it merely means the installation of another meter for the gas stove to do twice the business. I do not believe in giving away the stoves at all; but if we loan our meters, services and connections I do not know but that it would be good business to loan gas stoves. That is what I intended to convey in my former remarks.

Mr. Stone—I think we could help the gas stove industry to a very marked degree if we only had some way of educating the people to properly use the gas stove. There should be some way of educating the people so that they would know when the flame was just right, so that we could persuade the hired girl to turn the gas off when she was through using it and not leave the kettle on the stove to boil dry. If we could persuade the hired girl to turn the gas stove off when through with it, or if we could persuade her to use the simmering burner for boiling in place of the large burner, or if we could teach her to cook three or four vegetables over the same flame and arrange her work so that when the oven was heated she could bake three or four different things at one heating of the oven, we would be able to secure a much more economical use of gas as a fuel. I think it is the education of people in the use of gas as a fuel that we need.

The President—I think Mr. Doherty has formulated a scheme for educating the people which will strike you with considerable favor. I will, therefore, call upon Mr. Doherty.

Mr. Doherty—I would like to make some preliminary remarks before speaking of the scheme to which the President has alluded. I think by so doing I can make it a little more impressive. I am a firm believer in the fact that the cost of the stove with the cost of the service is not the sole reason that everybody does not use a gas stove. No one can ask for more abundant proof of that fact than that in many cities they absolutely give away the stoves and services and still do not put out many stoves. If it were simply the cost that stood in the way of these stoves being put out every man in town would have one. There must be some other reason. On that theory I concluded it was either that the people did not know about gas stoves, or else they did not realize the advantages of gas stoves, or else they overestimated the cost of running a gas stove. Now it is very easy to tell them about gas stoves through the newspapers and other advertising mediums, and it is also possible by these mediums to tell them of the merits of the gas stove.

I proceeded to advertise and solicit, but feeling that the people did not entirely appreciate the merits of the gas stove I employed a demonstrator from the Boston Cooking School to come to Madison and give free lectures. They were very successful at first, but finally we found that as about the same class of people attended the lectures all the time we concluded we were not reaching the class of people we wanted to reach. Many of them already had gas stoves, and after these lectures had run for a time interest in them seemed to wane. Our next step was to hire a demonstrator or cooking teacher, and to get the Board of Education to allot a period of time in the school hours for cooking. We stood all of the expense so far as the Board of Education was concerned, and in this way demonstrated the benefits of gas for cooking to all of the children from the "B" Grammar grade to the senior class of the High School. We kept that up for a year. The next year we tried another scheme. We took a gas stove every day in the week and had a demonstrator at some place in the city where they were using a gas stove and she invited all the neighbors around who did not have a gas stove to see how they worked, and we kept track of those who came and who did not come. We wanted everybody to see a gas stove working, and we followed that up for a year. With all of our various schemes it would be pretty hard for me to tell which was the most successful, but I think the advertising perhaps was as successful as anything else, and probably even the most successful. I refer to newspaper advertising. Now in some cities it is almost impossible to advertise in the city papers without undue expense. I was recently the temporary manager of a gas company located in a city which had 72 publications. If we advertised in one we had to advertise in all, or the other 71 that we did not advertise in would have it in for us. I did not intend to bring this out before this Association, but did intend to secure a meeting of the various Presidents of the different Associations and suggest that we formulate a plan for a National Advertising Bureau. I feel that where we now spend $1 for advertising, in that way for 10 cents we could secure better results if all of the members of the various Associations would join together, through the means of a National Advertising Bureau, and advertise the benefits and conveniences of the gas stove in the big magazines like "The Ladies' Home Journal," "Munsey's" and other leading periodicals. It would give gas for cooking a standing that it never will get by our individual efforts. But by collective efforts for advertising in such magazines I believe we would secure better results than by advertising simply in local newspapers. I am not in favor of ceasing to advertise in the local newspaper, if we already do it; but even if we do not do it I believe it would pay to advertise there also. I am sure, however, that with a comparatively small outlay, through the means of a National Advertising Bureau, we would secure a maximum return and far better results than by any other means we might adopt to push the sale of gas for cooking and general fuel purposes. If a motion at this time is not out of order, I would move, Mr. President, that this matter be referred to a proper committee, and that the committee be instructed to take this matter up with the other Associations, aiming to establish a National Bureau of Advertising.

Mr. Persons—Before that motion is put, along the same line as has been suggested by Mr. Doherty, I would say I think we ought to be able to form an association among the gas companies for the purpose of hiring demonstrators to go from one city to another, and thus save a great deal of traveling expense and everything of that kind. We all want a demonstrator more or less during the year, and it does not make any particular difference what time in the year this demonstrator is engaged. I have had a good deal of correspondence with several demonstrators, and find that $15 or $20 a week could be saved in the way of incidental traveling expenses by the formation of an association of this kind, and perhaps Mr. Doherty would accept an amendment to his motion to include something of that sort.

Mr. Doherty—I do not know that I quite understand Mr. Persons? Is it your idea to have one demonstrator for the State of Ohio?

Mr. Persons—Hire a demonstrator for the season letting her travel from city to city. For instance, she could give exhibitions in Cleveland for two weeks; Toledo for two weeks; Columbus, two weeks; Cincinnati, two weeks, arranging the time in such a way as to save traveling and other incidental expenses. In that way we could hire a woman to demonstrate the benefits of gas as a fuel very much cheaper than to have each company acting independently.

Mr. Doherty—Your idea is all right in theory, only you want to multiply it greatly. I found one demonstrator not enough for a town of 16,000 people.

Mr. Persons—Then we could hire them by the dozen. I will take a small bunch. (Laughter.)

Mr. Doherty—Your suggestion would apply more properly I think to the State of Ohio alone, and would properly come under the consideration of another committee to be appointed by this Association. The committee I propose is one simply for the purpose of conferring with the other organizations of the country in an effort to establish a National Bureau of Advertising. I think any step in the direction you have outlined is a good one and I hope you will push it along, but I would suggest that the two committees should act separately.

Mr. Persons—Then I will make a motion after yours has been acted upon.

Mr. Doherty—I suggest we have a small committee appointed to confer with the other Associations for the purpose of establishing a National Bureau of Advertising, and I make a motion to that effect.

Mr. B. E. Chollar—I will second the motion of Mr. Doherty for the appointment of a committee by the Chair for the purposes suggested by him in his motion.

The President—The committee to consist of how many?

Mr. Doherty—The fewer the better. I am on six committees this year, gas and electric, and have yet to attend the first meeting of any one of the six committees when all the members thereof were present. And we will recommend next year, in one of the organizations to which I belong, that all committees in the future shall consist of committees of one. In this case, however, I would suggest a membership of two at least.

Gen. Hickenlooper—Mr. Chairman, it is with extreme regret that I rise to interpose an objection to any suggestion by way of progress that might be made in that direction. I am only afraid that you are chewing off a little more than you can swallow. I am afraid you are taking a breadth of view in the scope of this question not warranted by the existing conditions of individual considerations as to localities, experiences and opinions of the parties most interested. It is probably not the proper time to discuss this question, but it would more properly be in order to discuss it at the time this committee presented its report. I am not in sympathy with Mr. Doherty's suggestion of giving the local press the cold shoulder.

Mr. Doherty—You misunderstood me, General. I did not advocate giving the local press the cold shoulder, but suggested that local advertising could be used the same as heretofore.

Gen. Hickenlooper—Well I have experienced the same difficulties that you have mentioned as to the innumerable applications that will be made for advertisement in case you give an advertisement to one of a number of competing papers. But at the same time there are other collateral considerations, as for instance the friendliness of the local press, which comes through a disposition to give them the patronage incident to that particular locality. I am a little afraid that you undervalue that influence and that you give to the monthly periodicals a greater value than they are entitled to. I fear the course which Mr. Doherty has suggested would have a tendency to estrange the local papers from your support. It is certainly a matter worthy of very serious consideration, and I would rather see that matter, so far as it pertains to our Company, left to the individual views and opinions of the promoters in a particular locality.

Mr. Doherty—Mr. Chairman, a national scheme of this sort can not be taken up individually. It has to be taken up collectively by a large number of our bigger organizations. If the general sentiment of this Association accords with General Hickenlooper's views, I would ask permission to withdraw my motion, because I do not want this pet scheme of mine to get a black eye before this organization. And if a majority of the members do not feel in accord with my views, but do feel in accord with the views of Gen. Hickenlooper, I would ask permission to withdraw the motion and take it up with some of the other Associations. I feel that it can be carried through. I do not think we have to discontinue any advertisement in the local papers. And in fact I would advise against the discontinuance of advertisements in local papers. I would also advise the extending of our advertisement to the national papers. And before the vote is put upon the motion I would like to have permission, if there is any general sentiment against it, to withdraw it, because if it is turned down here, or if it does not meet with the hearty support of this Association, I cannot hope to get the hearty support of the other Associations, who naturally would like to take the initiative in any move of this sort, if it is going to be a successful move.

Gen. Hickenlooper—In explanation of my position, I wish to say I trust the gentleman will not withdraw his resolution, and I think it proper enough for a resolution of that kind to be adopted, and would suggest that he be made the chairman of that committee, and that when the matter has gone that far then that he give to it more

thoughtful consideration than possibly he has had time to do, supplemented by the views of his co-laborers on the committee, which may possibly eventuate in a change of sentiment or views upon that subject. But as I said in my former remarks, this is hardly the proper time to discuss that question. It can more properly be discussed when it comes to permitting him to make his report. Then he can have reasons to assign at greater length and more conclusive as to why his views should be adopted by the Association. That appears to me to be the proper time for a more careful consideration of it. I see, however, no objection at all to the passage of the resolution authorizing the appointment of the committee to report back its findings and without power to act further in the premises. I see no objection to the passage of the resolution, with the undestanding that Mr. Doherty may give it in connection with this committee his very careful consideration.

Mr. Doherty—I would ask that this matter be postponed until to-morrow morning, and until I have an opportunity to get the sentiment of the other members of the Association. It is a subject which has been in my mind for some time, and I have tried to give it very careful consideration. I have had other schemes at various times in my mind, which, I have been told, were not practical, and I realize that no scheme of this sort is practical except in conjunction with the greatest possible individual effort. And if Gen. Hickenlooper, instead of throwing a wet blanket upon it, had said that he would heartily subscribe to a scheme of that sort I know it would have gone through with a gusto. There would have been no delay or anything of that sort. But this last year I have had two other schemes which I thought would better existing conditions, both of which I was told I could not carry through, and both of which looked to my mind just as feasible as this. When I presented one of them at the meeting of the League of American Municipalities at Syracuse, New York, it had the signature of every officer of the National Electric Light Association, but I received the support of not one member until I worked for it very hard.

Gen. Hickenlooper—That then was a compliment to your personal industry rather than to the merits of your scheme. (Laughter.)

Mr. Doherty—And I would ask that this matter be postponed until to-morrow morning and called up again at that time. We can then ascertain whether it meets with the general approbation of the members of the Association. If I find that it does not I will not bring it up.

Mr. Chollar—In our order of business we have an Executive Session, and if Mr. Doherty desires to get an expression of opinion on this matter it might be taken up in the executive session. Then it would not go into the record at all, and he could find out the sentiment of the Association at that time.

The President—I do not suppose there is any objection on the part of any member to postpone this matter until executive session, and it will be consequently so ordered.

Mr. Persons—I will bring up the matter of a demonstrator also at the executive session, and we can then determine whether we desire to employ them singly or by the dozen.

On motion of Mr. Cline a vote of thanks was tendered to Mr. Persons for his able and interesting paper.

A Dip into the Question Box.

The President—The time for noon adjournment is about here, but we might be able to dispose of some of the questions in the Question Box, thus advantageously putting in the time prior to adjournment. The first question is:

> "At present prices, which is the better enricher for coal gas, cannel or naphtha?"

Mr. Persons, what have you to say in answer to that question?

Mr. Persons—I would say cannel.

The President—Mr. Light, what have you to say with reference to it?

Mr. George Light—I have not any particular information to give upon the subject. At present we are using cannel, about 10 per cent. I think it will revert back to the question, "What will you do with your cannel coke when you are through with it?" At present we are using ten per cent. cannel coal as an enricher, and using the coke to fire the benches with. We get practically the same results from that coke that we do from coke out of other coal with the exception of more clinkers. It takes a little more time to keep our fires up and in proper shape. At present prices naphtha and crude oils have gone beyond our reach to an extent, and we find cannel about the best thing we can get at the present time.

The President—Mr. Butterworth, have you anything to say upon this subject?

Mr. Irvin Butterworth—Mr. President, I asked this question myself, so I am not prepared to give any information upon it. I will say, however, that we are using cannel for enriching at present.

The President—In connection with this matter we might also discuss Question No. 17, which is:

> "In view of the large amount of gas being used as fuel and in incandescent lights, does it pay to enrich coal gas above 18 or 19 candles?"

I will ask Mr. Printz his opinion upon this question.

Mr. Eugene Printz—No, sir; I have no opinion upon it. I do not know anything about it.

Mr. Butterworth—Mr. President, if you are just asking for individual opinions as to this question, and do not want it discussed at length, I will express mine for what it is worth. In a town where there is no natural gas, 18 candle gas is good enough with Welsbach burners.

The President—Did you say in a town where there is no natural gas, or where there is natural gas?

Mr. Butterworth—Where there is no natural gas. If it is natural gas that you are competing with you might better make a higher candle power possibly.

Mr. Cline—Why do you draw the distinction between a town where there is natural gas and where there is no natural gas?

Mr. Butterworth—So that the people will not be tempted to leave you for artificial gas.

M. J. H. Maxon—While on this subject I would like to ask if any member can state what is the difference in candle power of Welsbach light using 18 candle and say 24 candle gas? What would be the difference in the volume of light produced by that burner in the use of those different qualities of gas?

The President—Mr. Corbus I imagine has made a good many tests in that line and can possibly give us some information on the subject.

Mr. Corbus—Never having made any tests on that subject, Mr. President, I therefore am unable to express an opinion. I should think, however, it was simply a question of heat units. It would be merely a difference in the consumption of gas.

Gen. Hickenlooper—With reference to the question propounded in Question No. 17, I will say that my individual views are very decidedly in favor of straight, 17-candle power coal gas, and I announced my adherence to that proposition before this Association several years ago, at a time when there were not the elements introduced into our business which exist to-day, namely, that heat has become a more essential element in regard to illumination than has the candle power. With 17-candle power gas you have the three elements combined in one; you have a light which can be turned down to the lowest possible limit or turned up as you may desire, and you have the most effective gas known to science to-day for domestic purposes in 17-candle gas, because it possesses and contains the greatest number of heat units, and, therefore, is the most serviceable for all domestic purposes. If upon the contrary the consumer desires a higher degree of illumination there is to-day nothing that can be equaled by the Welsbach lamp in the production of illumination, considering cost. So that 17-candle power coal gas possesses the three essential and economical uses and purposes for which gas is supplied, and I say very decidedly and emphatically, get rid of your naphtha and get down to 17-candle coal gas.

Mr. Geo. D. Roper—I would not quote my authority, but I saw an estimate from an engineer concerned in one of the large gas companies in which he had taken 17-candle coal gas and also taken 27-candle water gas and made a thorough test, the result of which was to show that it is not a question of candle power so much as it is of pressure. On an inch pressure or fifteen-tenths pressure you do not get as good results as you do when you carry it from 2 inches up to 3 inches. If you carry a pressure from 2½ to 3 inches with low candle-power gas you will get better results than with high candle-power gas and low pressure.

Mr. Doherty—The statement made by Mr. Roper is eminently true, but he does not state the conditions underlying it. It is not the pressure that gives you the increased efficiency, but it is what you must get from that pressure. And if we wish to construct our Bunsen burners more carefully we can get the same efficiency from a lower pressure that we now get from a higher pressure, although we can always get probably a higher flame pressure if we have a high pressure, because we can get a more intimate mixture, and in that way get quicker combustion, which makes more intense combustion and higher flame temperature. A point that has been lost sight of very frequently in using the Bunsen burner is that we do not get any more heat but we get greater intensity of heat and the more rapid we can make that combustion the greater the intensity of heat will be, and I have advocated high pressure for that reason. I got the laugh at Springfield a year ago.

for doing it. I then advocated higher pressure for the sake of better regulation and better results for the Bunsen burner.

Mr. Roper—What I was trying to bring out was the fact that the results are obtained not so much from candle-power as from pressure. This same gentleman to whom I referred before made the tests on 1, 1½, 2, 2½, 3, 3½ and 4 inches pressure. I saw the tests made. In boiling water it took on a test meter registering one-tenth of a foot of gas, and the difference in the consumption of the gas under the varying pressures was so small that you could not have read it if you had not pasted a piece of paper at the point where the large hand came to the first time. The next time it would come around there would not be the fraction of an inch difference in the circle at the dial. It took the same amount of gas in all the pressures practically, but the difference was the different length of time it took to do it. The higher the pressure the less time it took to do the work.

Mr. Maxon—The point I wanted to get at in asking the question was this. Suppose you had two Welsbach burners, one working on 17 candle gas, at say 2 inches pressure, and developing a certain candle-power, and the second working on 26 or 27-candle power gas, at 2 inches pressure, also both using the same quantity of gas, what would be the difference in the light produced by the two burners? I doubt if any one can answer that question off-hand. It is simply a matter of flame temperatures.

Mr. J. G. Stephens—Regarding that it would depend altogether on the heat units in the gas. The light is not made from quantity nor from pressure, but is reflective light produced by heat. When you take the heat units or carbon reduced down to the heat where you have perfect combustion then you get the result of the candle power from the heat. Pressure may have something to do with certain lines of burners, because it would require a certain quantity of oxygen to secure perfect combustion; but if you get perfect combustion then you have reduced it down to perfect heat, and you cannot get any more out of it, and you are then getting the desired result. If with 17-candle power gas made from coal you have got the highest degree of heat units in it, and you take another gas of 27-candle power which does not have the highest degree of heat units, then the 17-candle power will give the best light.

Mr. Doherty—Mr. Chairman, I am very sorry to differ with my old friend, Mr. Stephens, but it is not quantity of heat which produces the desired result, it is intensity of heat; and if those two things, quantity and intensity, were not so frequently confounded we would not so frequently be mixed up on our results. But it is the intensity of heat in the Welsbach burner, or the incandescent gas lamp of any sort, that will fix the amount of energy which will be transformed from heat into light, and the same volume of heat, the same number of British Thermal Units, with a high flame temperature will give much more light than a very great volume of heat. If Mr. Stephens will conduct his experiments, using producer gas or straight, unenriched water gas, he will find that to be a fact.

The President—Question No. 8 is:

"Which are the more equitable: Differential or uniform prices of gas?"

And Question No. 9, which may be discussed in conjunction with the above, is:

"If fuel and light prices are made, what should the percentage of difference be between them?"

Has anybody anything to say upon this subject?

Mr. Philipp—Those are very hard questions to answer off-hand.

The President—Mr. McIlhenny, we would like to hear what you have to say upon the subject.

Mr. McIlhenny—It is such a broad subject, and so limited by local conditions and environments, that I do not believe any satisfactory answer can be given off-hand. It is a question which must be left to a great degree to local conditions, and should be determined upon the basis as to which plan should be followed to make the most money at the end of the year for the gas company.

Secretary Jones—I would like to ask Mr. McIlhenny if it is a fact that the Supreme Court of Pennsylvania has decided that differential rates are not according to law in that State?

Mr. McIlhenny—I do not profess to be thoroughly posted on the legal situation, but my understanding of it is this; it is not a straight issue just as you mention as to differential rates for artificial gas. The question came up in this way—there was a member here awhile ago who would know all about it, as he is connected with the company against which the suit was brought, but I see he has stepped out of the convention hall. The natural gas company became interested in the artificial gas company in a small town in Pennsylvania, and in order to develop the artificial business it notified the consumers that if they used natural gas for illuminating purposes they would have to pay $1 per 1,000 for it, or whatever the regular rate was for illuminating gas. A consumer in the town brought suit against the company to compel it to sell gas to him at the same rate at which he was permitted to use natural gas for fuel purposes. In other words, to compel the company to sell natural gas for illuminating purposes at the regular natural gas rate, which, I think, was 20 cents per 1,000 cubic feet. The lower court decided in favor of the gas company, stating that the company had the right to regulate its product, and that it was a question as to the value of the product to the consumer. That decision was appealed to the Superior Court of the State. There are two higher courts there, a Superior Court and a Supreme Court. It was taken to the Superior Court and that Court reversed the decision of the lower Court, saying that the company under the circumstances did not have the right to regulate it in that way, holding that the natural gas company obtained its supply of gas from the earth, and it did not cost that company any more to bring along a large amount of gas than it did to furnish a smaller amount of gas, so far as the supply obtained out of the earth was concerned, whereas in the manufacture and furnishing of artificial gas it did make a very marked difference. If you manufacture a certain extra amount of gas you can do it with greater economy, and if you can increase the use of gas at certain times you can afford to sell it at a less price, so that the issue as to illuminating gas did not come up, but it was limited to the question as to the sale of natural gas, the contention being that the company did not have the right to limit it by the value to the consumer, but the question was to be determined by the value or cost of production.

On motion of Mr. Penn, the Association adjourned, to reconvene at 1:30 P. M.

[To be Continued.]

Weight of Gasholders.[1]

The question has been raised by one of our correspondents whether, in estimating the weight of a gasholder from the pressure it throws in inches, it is necessary to add anything to the weight arrived at on account of the lifting weight of the gas it contains; and it is suggested that the rule given in most text books would only give the correct result supposing the holder is filled with air. Our correspondent appears to be correct in his conclusion; it is necessary to add something on account of the lifting weight of the gas contained in the holder. The question is, however, one of general interest, and it seems worth while devoting a little attention to it, from the point of view of general principles, as well as of the practical application.

The formula given for the weight of gasholders is that if W be the required weight in pounds, i the number of inches pressure, and A the area of the water in the holder in square feet, $W = 5.2Ai$. This formula may, perhaps, be put more clearly in another form. A square foot of water, 1 inch deep, weighs 5.2 (or, rather, 5.208) pounds; i inches deep, one square foot weighs $5.2i$ pounds, and A square feet weigh $5.2Ai$ pounds. But this is the amount of water which, through water having been pushed out of the holder into the tank, is, as it were, missing, being replaced by gas, below the external water-level in the tank; and the proposition implied in the formula is that the weight of the holder must be equal to the weight of the water which, inside the holder, is missing below water level when the pressure is put on.

It is very convenient that we are able to consider the external water level as if it were fixed. A little up or down makes no difference to the way in which the holder floats in the water actually present in the tank. If the level of this water be lowered, the holder follows it equally; if it be raised, the holder rises to an equal amount. The actual water level in the tank outside the holder is therefore our standard of reference; and we might, if we please, when drawing diagrams to illustrate the manner of floating of the bell, represent the water level in the tank as if it were always the same. If we thus consider the water level external to the holder as always the same, we might say that the formula tells us that the weight of the bell must be the same as that of the water displaced out of the holder. This is true so long as we have to deal with air in the holder; but more weight would be needed if we have coal gas in the holder, and less if we have carbonic acid, as we shall presently see.

An idea is very apt to get hold of the mind that such a thing as a

1. From the *Gas World*.

balloon has a tendency to rise, and is therefore able to lift a certain amount of mass, which is called its lifting weight. But it is obvious, on consideration, that there is no such thing as negative gravity, and no inherent tendency to ascend. The balloon tends to fall, but the air around it is heavier than it, and gets beneath it continuously, lifting it up, just as when you pour mercury into a bottle containing some water, the mercury will get beneath the water and lift it up. A cork apparently tends to rise in water because the water surrounding it is heavier and flows beneath it in the same way. Precisely the same thing happens with hot air in a chimney; the heavier cold air flows beneath it from all around and the hot air is pushed up the chimney. There is no such thing, in truth, as a chimney "draught"; the hot air does not of itself drag upwards; it is the surrounding cold air that does the work, pressing in as it does from all sides. We may load our balloon until it just fails either to rise or sink. The weight of the whole affair is then exactly the same as the weight of an equal bulk of air, and the mutual behavior of it and the surrounding air is exactly the same as if it were merely an equal bulk of air which we may suppose enclosed in a weightless covering, an imaginary film which merely served to locate and identify the bulk of air in question.

In the same way we may imagine our gasholder to have no weight at all and to be merely a film, capable of maintaining its shape and of containing the gas. Let us suppose it to be filled with air and that we start with the water level the same outside and inside. What will happen? Nothing will happen. There is nothing to cause a flow of water, and there is nothing to cause a displacement of air. Now let us suppose it to be filled with hydrogen. What will happen then? The holder at the bottom of the ocean of atmospheric air will be like a cork at the bottom of water, and will tend to rise; the hydrogn in it will tend to expand. The internal pressure will thus be diminished and the difference between the external and internal pressures will cause water to rise in the holder until just so much has gone up into the holder that the two contents of the holder, hydrogen and water, taken together, *above the external water level*, reach the same weight as an equal bulk of air would have. The hydrogen in the holder would be at a less pressure than the surrounding atmospheric pressure by an amount represented by the of number inches water in the holder above the surrounding water level.

The calculation of this rise of water in the holder is not difficult but calls for patience, and we do not propose to inflict it upon our readers. The method to be followed may, however, be stated. Assume that the water rises $12p$ inches or p feet in the holder. Then, if the atmospheric pressure be P feet of water, the hydrogen in the holder is at a pressure of $P - p$ feet, p feet less than the atmospheric. It would therefore occupy a volume greater than its original volume in the ratio $P:P-p$, and, correspondingly, it would occupy a height in the holder, H′, greater than its original height H in the same ratio $P : P-p$. So much for the hydrogen; and the water stands at p feet, so that water and hydrogen together take a height $(H' + p)$ feet above the external water level. The weight of a corresponding bulk of air can be readily found; the original hydrogen weighed so much; the difference gives the weight of the water which now stands above water level. From this it is easy to learn the height at which it stands; but the expression we have now found for this height must be equated to p. This gives a quadratic equation from which the value of p can be determined, provided sufficient patience is brought to bear upon the operation; and then $12p$ represents the inches of water, and $5.2 \times (12p) \times$ area in square feet represents the weight of water which has been lifted.

But now let a weight equal to this, instead of being allowed to be drawn up in the form of water from the tank, be laid upon the weightless holder. Then the whole affair as it originally stood above water would have the same weight as an equal bulk of air, and there would be no ascent. Any less weight than this would have some such effect, and the ascent would be less, but would always be such as to bring the whole weight above water-level to an equality with that of an equal bulk of air. It would come to the same thing if the weight were applied in the construction of the holder itself. There must be at least this weight in the holder, in order to prevent the holder from lifting and dragging water up after it when it is filled with gas lighter than air, and to enable the gas to be at atmospheric pressure with the water level inside the holder the same as that outside in the tank.

With a gas heavier than air, on the other hand, the weightless holder would tend to rest heavily on the water and to depress the surface of the water; and the heavier the gas was the more it would do this. The gas would thus become somewhat compressed by its own weight. In order to equalize the levels and bring the gas to atmospheric pressure, it would be necessary to apply a force to pull the holder up somewhat out of the water, or else to lower the level of the water in the tank.

When a gasholder has had enough weight put upon it or into its material to prevent ascent, as above explained, we may regard it as in equilibrium so far as regards the air and any *further* weight put on produces displacements in the water. Thus if the water be depressed 10 inches over an area of, say, 1,000 square feet, the amount of water displaced is $5.2 \times 10 \times 1{,}000$ pounds in weight; and the effective weight pressing upon the surface of the water through the intermediary of the gas in the holder must be equal to this, in the case of the holder being filled with air. The water tends to return to the holder; the gas in the holder keeps it down, for being compressed it tends to expand.

What the usual formula shows is the weight necessary to produce the given required pressure when the holder is filled with air. When it is filled with gas the weight must be greater, so as to neutralize the lifting effect before any pressure at all can be thrown. But it does not follow that the rule is practically wrong. It gives too low a weight, of the order of about one ton for each 50,000 cubic feet of gas; but since we are not always working at the maximum pressure which the holder is capable of producing, the effect of the rule as it stands is to save the trouble of easing off the pressure to meet the actual requirements, and to leave it possible to adjust the weights when extreme pressures are required instead of easing off when moderate pressures are called for. Any formula for this correction would be extremely complicated, and the errors due to omission of this and of a correction for the loss of pressure due to the partial submersion of the holder under water do not, as a rule, cause a defect of more than 5 per cent. in the pressure.

The Estimation of Bisulphide of Carbon.

By Dr. A. Goldberg.

The method of estimating bisulphide of carbon which I am about to describe is based on the following theoretical considerations:

(1.) $CS_2 + 2NH_3 = CS \begin{cases} SNH_4 \\ NH_2 \end{cases}$

(2.) $CS \begin{cases} SNH_4 \\ NH_2 \end{cases} = H_2S + CNS.NH_4$

(3.) $CS \begin{cases} SNH_4 \\ NH_2 \end{cases} + ZnO = ZnS + H_2O + CNS.NH_4$

(4.) $H_2S + ZnO = H_2O + ZnS$.

The different reactions take place in part successively, and in part simultaneously, but finally the quantity of zincic sulphide formed is equivalent to the quantity of sulphide of carbon which entered into the reaction, so that the calculation can be easily made according to the simple relation $CS_2 = H_2S = Zn$.

The reagents required are: An ammoniacal solution of zinc of known strength, and a solution of sodic sulphide titrated by means of the zinc solution. The substance under examination is heated on a water bath with alcoholic ammonia to a temperature of about 60°, but a temperature of 100° does no harm; the operation is carried out in a small flask stout enough to bear pressure, and the stopper should be firmly held in. Into this flask is poured 1 grm. of the sample of sulphide of carbon, 5 or 6 c.c. of ammonia (d=0.910), and about 25 c.c. of absolute alcohol; it is then tightly closed and left to stand in a warm place.

When the reaction is finished, the solution should be of a yellow color; the contents of the flank are poured into a beaker and considerably diluted, a known volume of the ammoniacal solution of zinc is then added, and the whole heated to boiling with continuous stirring, and the excess of zinc determined by the aid of a titrated solution of sodic sulphide in the presence of nitro-prussiate of soda as an indicator.

When more than 0.2 grm. of bisulphide of carbon is taken for estimation, it is better to make up to a known volume, and then take an aliquot part for the titration.

The following are the results of a few estimations, made according to the method just described, on samples of perfectly pure bisulphide of carbon:

Grm.		Grm.		Grm.		Per Cent.
0.2178	CS_2 used	0.1861	Zn	=0.2175	CS_2 =	91.86
0.4723	" "	0.4041	"	=0.4725	" =	100.05
0.4502	" "	0.2843	"	=0.4494	" =	99.82

It has been mentioned above that the solution has a yellow color after heating; at the ordinary temperature, it is of a reddish yellow color from the commencement. When diluted, after some hours, with a large quantity of water, it gives a perfect solution, but it absorbs a slightly smaller quantity of zinc. In this manner, a known quantity of bisulphide of carbon has given the following results:

1. *Hot.*—(*a*) 0.2190 grm. Zn; (*b*) 0.2175 grm. Zn; (*c*) 0.2181 grm. Zn; (*d*) 0.2175 grm. Zn; (*e*) 0.2181 grm. Zn. Mean, 0.2180 grm. Zn = 0.2549 grm. CS_2 = 100.27 per cent.
2. *At the ordinary Temperature.*—(*a*) 0 2123; (*b*) 0.2116; (*c*) 0.2116; (*d*) 0.2135; (*e*) 0.2116; (*f*) 0.2117 grm. Zn. Mean 0.2122 = 97.6 per cent of the theoretical amount.

This is probably due to the formation of a certain quantity of sulphocarbonate of ammonia at the ordinary temperature:

$$CS\begin{matrix}<\\<\end{matrix}\begin{matrix}SNH_4\\NH_2\end{matrix}=H_2S+CNS.NH_4$$

$$CS_2+H_2S=2NH_3+CS\begin{matrix}<\\<\end{matrix}\begin{matrix}SNH_4\\SNH_4\end{matrix}$$

a body which gives, during titration, $ZnCS_3$, which, on boiling, is mostly transformed into ZnS and CS_2. The result is that, with this secondary reaction taking place at the ordinary temperature, the relation is no longer $Zn=H_2S=CS_2$, but $Zn=2H_2S=2CS_2$.

The reaction is not changed if, instead of using alcoholic ammonia, ordinary aqueous ammonia be taken, but a longer time is necessary to complete the reaction. For example, 5 c.c. of bisulphite of carbon were treated with 30 c.c. of aqueous ammonia of 0.91 density, and heated for some days until the bisulphide of carbon had completely disappeared.

The solution cooled to the surrounding temperature was diluted to 250 c.c.; 10 c.c. required 0.2176 grm. of Zn (instead of 0.2174); that is, 100.09 per cent. found.

A Novel Application of Electric Heat.

By Mr. E. J. Hart, in *Elec. World.*

The authorities of Marquette, one of the most prominent towns in the upper peninsula of Michigan, believe they have hit upon a plan of warming the water of Lake Superior on an electric stove before admitting it, through the intake pipe, to the city water works system, and by carrying their plan into effect at a cost of $25, they consider they have averted the necessity for changing the location of the pumping station and intake pipe at a cost of from $50,000 to $100,000.

For many winters past the city has been greatly bothered by ice from the lake, which has choked up the intake pipe so as to entirely shut off the water supply and necessitate the closing down of the pumping station. This has occured dozens of times in the past few years, and water famines have resulted annually. It has been necessary in each case of a "choke up" to thaw out the mouth of the intake with salt, but this has only remedied the evil temporarily, and after some delay and a great deal of trouble. The trouble has grown to such proportions that the question of spending many thousands of dollars to change the location of the intake pipe and pumping station had been agitated.

The trouble at Marquette was not with the surface ice of the lake, but with "needle ice," as it is called. When the lake freezes over the water supply is not affected, and the surface ice is rather a protection to the intake. The trouble comes, however, when the ice fields are carried out of the bay by winds, and the same winds prevent new ice from forming on the surface. Small particles of ice—"needle ice"—form, and then millions of the particles mass together and are carried into the intake pipe. The vertical section of this which admits the water is 2 feet in diameter, but the masses of ice are sufficient to entirely block it.

About three weeks ago a famine of unusual severity resulted from an ice blockade of this sort, and the city water board solicited the assistance of some local engineers to remedy the trouble; if possible, permanently. Superintendent Charles Retallic, of the municipal electric light and power plant, was one of these, and he devised a plan by which it is hoped to do away with the evil entirely. The plan provides for an electric heater of cylindrical form, hung concentrically within the opening of the vertical section of the intake pipe. This heater was completed and put in place last week, and it will be tested as soon as the wind again carries away the surface ice and the conditions are suited to the formation of the fine ice particles that cause the trouble.

The heater is of the iron resistance coil pattern, and the only novelty about it lies in its adaption to the use for which it is intended. It consists of an innner and outer drum of galvanized iron, respectively 19 and 21 inches in diameter, and both 5 feet in length. The inner drum has flanges at the ends extending outward, and to these the outer drum is soldered. The inner cylinder was wrapped with asbestos sheeting to a depth of nearly half an inch, and around this were wrapped convolutions of No. 18 iron wire, in one continuous spiral. Terminals were carried through the flange at one end, through water-tight gaskets of heat-proof insulating material. Iron shoulders are riveted to the apparatus and by means of these it is hooked over the top of the intake pipe. It extends from the top of the vertical section of the intake to within two feet of the horizontal section, and the former only stands seven feet high.

Current is supplied from the electric light wires at the water works plants on the beach. It is carried through conductors intended for submarine service, and where the wires enter the water they pass through a conduit of iron piping to protect them from shore ice. The stove will generate enough heat, it is believed, to melt all the needle ice before it passes through the cylinder. The plan is not to keep it in constant use, but only when the conditions of the weather are favorable to the formation of this sort of ice.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

The main offices of the Standard Gas Light Company of this city have been removed from 31 Nassau street to 801 Third avenue, between 49th and 50th streets.

The new power house for the Pittsburg Reduction Company, at Shawenegan Falls, Province of Quebec, Canada, will be furnished by the Berlin Iron Bridge Company, of East Berlin, Conn.

The property of the Medina (N.Y.) Gas and Electric Company will be sold at Sheriff's sale on the 26th inst.

Ex Mayor McLean, of Passaic, N. J., who returned from San Francisco something over a fortnight ago, after an inspection of the plant of the Equitable Gas Light Company of that city, has withdrawn from the opposition concern which had been seeking a franchise to supply gas in Passaic. The promotors of the opposition movement proposed to use the process employed by the Equitable Company.

Mr. D. B. Dyer, President of the Gas Light Company of Augusta, Ga., denies positively that that property is about to change ownership.

"L. N. R." is informed that the interest formerly held in the Newark (Ohio) Gas Light and Coke Company, by Mr. N. B. Mallon, was purchased by Mr. George B. Sprague, of Newark.

The shareholders in the Brooklyn Borough Gas Company, of Brooklyn, N.Y., have elected the following Directors: James A. Huestes, Albert Seligman, R. L. Austin, Horace T. Potts and Herman Wischman.

In the reorganization of the Seneca Falls and Waterloo (N Y.) Gas Light Company, the properties of which we formerly noted had been purchased by Mr. W. T. Morris and associates, the following management was named: Directors, Fred. Maier, Jr., and Jasper N. Hammond, of Seneca Falls, and George S. Sheppard, W. T. Morris and L E. Sheppard, of Penn Yan; President and Treasurer, Wm. T. Morris; Secretary, P. W. Bailey.

Mr. Moses Coombs, Jr., has accepted a responsible position with the Pulaski Gas Light Company, of Little Rock, Ark.

At the annual meeting of the Middletown (Conn.) Gas Light Company the officers chosen were: Directors, A. B. Calef, W. H. Burrows, W. J. Elmer, Henry Woodward and H. L. Mansfield; President, A. B. Calef; Secretary and Treasurer, H. L. Mansfield; Supt., Seth D. Clark; Asst. Supt., J. A. Harvey.

The Spokane Falls Gas Light Company, Spokane Falls, Wash., is yielding satisfactory returns to its shareholders. The Trustees have declared dividends of 6 per cent. on the preferred stock and 5 per cent. on the common, each payable on demand.

The Board of Gas and Electric Light Commissioners of Massachusetts, will this week hear testimony over the petition for a reduced gas rate for the City of Lowell.

Mr. Robert Allison has resigned from the Board of Directors of the Cincinnati Gas Light and Coke Company. He served thereon for many years.

Superintendent Dole, and the others of the executive force of the Bangor (Me.) Gas Light Company, are comfortably located in the Company's handsome, new offices in the Red building, Central street. The feature of the establishment is a well laid out and completely stocked

showroom. Mr. Dole means to put out many gas stoves in Bangor this summer.

REGARDING the contention over the gas supply of Haverhill, Mass., the Fifteenth Annual Report of the Board of Gas and Electric Light Commissioners contains the following: "In July, 1899, the Haverhill Gas Securities Company was chartered under the laws of this Commonwealth with a capital of $500,000, and with the avowed purpose to 'transact a general brokerage business, and to purchase, hold, sell, assign, transfer, mortgage, pledge or otherwise dispose of the shares of capital stock, or of any bonds, securities or evidences of indebtedness created by any other corporation or corporations of the Commonwealth of Massachusetts, and while owner of such shares of stock to exercise the rights, powers and privileges of ownership.' It has since transpired that in these words the real purpose of this corporation was adroitly concealed. Its promoters and principal incorporators had previously completed negotiations for the purchase of all the outstanding stock of the Haverhill Gas Light Company, whose par value was $75,000, and had agreed to pay therefor substantially the entire capital of the Securities Company. The money for this purpose was first used to pay up the stock of the Securities Company in formal compliance with the law, and immediately paid out to the stockholders of the Gas Light Company in payment for their stock, the entire capital of the former Company being used for this purpose. The Securities Company then proceeded to issue and sell 5 per cent. debentures for the full amount of $500,000, with the stock of the Gas Light Company deposited with a trustee as the collateral therefor. The holders of the Securities Company's bonds were thus made to contribute the entire amount paid for the Gas Light Company's stock. The amount originally paid in by the promoters was then where it might be returned to them as a dividend of the Securities Company, leaving to them as a profit the entire capital stock of the Securities Company and the control of the Gas Light Company. We have been unable to learn that the Securities Company possesses or expects to acquire any property other than this equity in the Haverhill Gas Light Company's stock, or to have any source of income except the returns of that Company's business. Chapter 310 of the Acts of 1868, re-enacted as Section 18 of Chapter 105 of the Public Statutes, and in Chapter 350 of the Acts of 1894, contains the following provision: 'No railroad corporation, telegraph or gas light company chartered under the laws of this Commonwealth shall hereafter declare any stock dividend or divide the proceeds of the sale of stock among its shareholders. * * *' This is not merely a prohibition against stock watering, but against the division of surplus into new capital stock. The principle announced in this statute ought not to be defeated by any shrewdly contrived method of stock manipulation. The obvious purpose and tendency of the Securities Company are to evade and annul the policy which this statute declares. Its acts are indirectly but distinctly an effort to capitalize the Gas Light Company's surplus, and its existence is a menace to the interests of the gas consuming public in Haverhill. The Board respectfully recommends that the Legislature annul the charter of the Haverhill Gas Securities Company. Such a course would tend only to restore the stock of the Gas Light Company to the bondholders of the Securities Company, who have already virtually bought it at a liberal price, and deprive the promoters of the Securities Company of no property except an opportunity for profit through a manipulation of the stock of the Gas Light Company, carried on in defiance of what for more than 30 years has been the well understood policy of the State toward such corporations."

ON March 23d the plant of the Listowel (Canada) Gas and Electric Light Company was badly damaged by an explosion that occurred in the boiler room. The engineer (Wm. Brillin) was severely injured.

THE rate war at Peoria, Ills., is on in earnest. The old Company is said to be charging 50 cents per 1,000, while the story further goes that the opposition concern is charging 40 cents per 1,000, less 10 cents for prompt payment!

THE special meeting of the shareholders in the Consumers Gas Company, of Newburgh, N. Y., to vote upon the proposition to convey its properties, franchises, etc., to the Consolidated Gas, Electric Light, Heat and Power Company, will be held to-morrow.

A CORRESPONDENT in San Francisco, writing under date of March 20th, incloses the following: "A decision that has been awaited by the various county assessors of California, was rendered yesterday by Judge Budd. It concerned the case of the Stockton Gas and Electric Company against the County of San Joaquin, and was brought to recover taxes paid under protest on the franchise held by the corporation in this county. While the amount involved in the case was only $1,432.43, yet the decision is of much importance, as it holds that a Company must pay taxes on its franchise, even though its corporate home is in another county. County Assessor C. L. Ortman assessed the franchise, in 1897, at a valuation of $164,519, and the corporation protested against paying the taxes. The matter was referred to W. B. Nutter, who was District Attorney at that time, and he said that he was of the opinion that the franchise was assessable only in San Francisco, which is the 'principal place of business' of the corporation. The Board of Equalization then reduced the valuation to $24 000 and the Company paid the taxes. The franchise was assessed in San Francisco for $1,000. County Assessor Ortman, however, desired to test the matter, and on the following year he assessed the franchise at a valuation of $115,108. The Board of Equalization refused to lower the assessment and the taxes were paid under protest. Nicol, Orr & Nutter were retained to bring suit to recover the money. District Attorney Ashley represented the county. There is another suit pending for the taxes on the franchise for 1899. The decision of Judge Budd is as follows: 'When natural persons associate themselves together under the laws of this State, and such association becomes under such laws a corporation, this corporation, by and under the laws of the State, is granted the franchise of becoming a person with such powers of a natural person as is provided by law. Such franchise is taxable, if taxable at all, in the county of the place of business of the corporation, as stated in its articles of incorporation; but any other franchise granted to such corporation is taxable as the franchise would be taxable if granted to a natural person. A franchise is property subject to taxation (Constitution, Article 13, Sec. 1), and it must be assessed in the county in which it is situated (Constitution, Article 13, Sec. 10.)

"A franchise at common law was a branch of the king's prerogative, subsisting in the hands of a subject. The king was the sovereign in England. In this State the sovereign power of the State is in the people of the State, and such sovereign power is only to be exercised in the manner and as prescribed by law which the people of the State have enacted, in and by the Constitution of the State, subject, however, to the limitations and restrictions prescribed by the Constitution of the United States.

"A right to erect poles in the streets of a city and to place thereon wires for the transmission of electric light, and a right to dig up the streets of a city and lay down therein pipes for conveying therein illuminating gas does not exist in any private person, or in any private corporation, until such right is granted, and when such right is granted it is a franchise. It is contended that Section 19 of Article 11 grants this right; but neither a natural person nor an artificial person (which a corporation is) could, even under the direction of the Superintendent of Streets of the city of Stockton, erect poles in that city and stretch and maintain wires along said poles or dig up the streets of said city and place and maintain pipes therein for the purpose of furnishing gaslight or other illuminating light for the supply of the city and its inhabitants with said lights until the city did some acts in relation thereto, and the doing of such acts by the city in effect is the giving of a right to such person, whether a corporation or a natural person, to place poles in the public streets of the city, stretch wires along said poles, dig up the streets of said city and place pipes therein.

"No person or private corporation has any natural right to do these things, and the right or franchise of a person, whether a natural person or an artificial person, to do these things must have been granted under and by virtue of the sovereign power of the people of the State, exercised in accordance with law, and the right or franchise so granted could only exist and be exercised in the city of Stockton, and under the provisions of Section 10 of Article 13 of the Constitution could only be assessed in the county in which such franchise existed.'"

THE *Metal Worker* says that at a recent meeting of the City Gas Committee of Manchester, England, some interesting particulars were given with regard to the amount of copper coins collected in the prepayment gas meters of that city. The statement says that 20 English pennies weigh 1 pound avoirdupois. In £5 sterling there are 1,200 pennies, weighing 24 pounds; and in £100 sterling there are 24,000 pennies, weighing 480 pounds. A ton of copper contains 112,000 coins, worth £446, 13s., 4d. In one week £958, 11s., 5d. was collected from 5,846 prepayment meters, or an average amount of 3s. and 3d. from each meter. This sum was represented by 230,057 copper pennies, weighing 4601 pounds avoirdupois, or a little over two tons one hundredweight. The money was collected by 32 inspectors, showing 144 pounds weight for each man. Thirty feet of gas are supplied for one penny (2 cents), and 3s., 3d. would therefore represent an average consumption for each meter of 1170 feet of gas.

The Market for Gas Securities.

The feature this week that held the attention of investors in local gas shares was the publishing of the valuations under the special franchise tax law, otherwise known as the Ford bill, of the gas corporations affected by that measure. Under the initial "fixing" the valuations for the chief Companies are: Consolidated, $15,828,600; New Amsterdam, $5,561,750; Standard, $3,439,790; Mutual, $2,703,110; Brooklyn Union, $9,516,170. How these valuations were arrived at seems not particularly determinable, but they are all subject to revision prior to May 1st, on which date the amended list will have been placed in the hands of the Tax and Assessment Department of the city for collection, "under the rule." All of this taxation scheme will be contested in the courts.

Values in local shares augmented considerably during the week. Consolidated opened to-day (Friday) at 189, sold above 191, and closed at 189½ to 190. It is pretty well understood that the suicidal gas rate period is about at an end, and it is further agreed upon that the Consolidated Company's Directors have not fought in vain. Brooklyn Union sold above 153, and is still very cheap. As a rule, the outside list is strong.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 Wall Street, New York City.

April 2.

☞ All communications will receive particular attention ☜ The following quotations are based on the par value of $100 per share.

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$54,595,200	100	189½	190
Central Union, Bonds, 5's.	3,000,000	1,000	103½	105
Equitable Bonds, 6's	1,000,000	1,000	105	..
" 1st Con. 5's	2,300,000	1,000	115	118
Metropolitan Bonds	658,000	..	108	112
Mutual	8,500,000	100	275	300
" Bonds	1,500,000	1,000	100	102
Municipal Bonds	750,000	..	..	
New Amsterdam Gas Co.	13,000,000	100	31¾	32½
Preferred	10,000,000	100	54	55
Bonds, 5's	11,000,000	1,000	99¾	100
Northern Union, Bonds, 5's.	1,250,000	1,000	95	97
New York and East River..				
Bonds 1st 5's	3,500,000	1,000	109	111
" 1st Con. 5's	1,500,000	..	115	..
Richmond Co., S. I.	348,650	50	70	..
" Bonds	100,000	1,000	..	..
Standard	5,000,000	100	100	115
Preferred	5,000,000	100	125	140
Bonds, 1st Mortgage, 5's	1,500,000	1,000	110	114
Yonkers	299,65	500	130	..
Out-of-Town Companies.				
Brooklyn Union	15,000,000	100	152½	153
" " Bonds (5's)	15 000,000	1,000	118	119
Bay State	50,000,000	50	1⅜	1⅝
" Income Bonds	2,000,000	1,000	..	75
Binghamton Gas Works	450,000	100	40	..
" 1st Mtg. 5's	475,000	1,000	96½	99½
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	..	77½
2d " " "	3,000,000	1,000	42	45
Buffalo City Gas Co.	5,500,000	100	5	8
" " Bonds, 5's	5,250,000	1,000	69	71
Central, San Francisco	2,000,000	..	106	108
Chicago Gas Co. Guaranteed Gold Bonds	7,650,000	1,000	104	104¼
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,207,000	1,000		108
Columbus (O.) Gas Lt. & Heating Co	1,682,780	100	60	65
Preferred	3,026,500	100	84	86
Consumers, Jersey City Bonds	600,000	1,000	102	105
Cincinnati G. & C. Co.	8,500,000	100	195¾	196½
Consumers, Toronto	1,700,000	50	230	235
Capital, Sacramento	500,000	50	..	35
Bonds (6's)	150,000	1,000	..	..
Consolidated, Baltimore	11,000,000	100	54¾	55
Mortgage, 6's	3,600,000	..	..	118
Chesapeake, 1st 6's	1,000,000	..	..	..
Equitable, 1st 6's	910,000	..	..	..
Consolidated, 1st 5's	1,490 000	..	..	112
Consolidated Gas Co. of N.J.	1,000,000	100	15	19
" Con. Mtg. 5's	880,000	1,000	87	90
Consolidated G. & E. Co.'s., Little Falls, N.Y.	90,000	100	..	100
Bonds	75,000	..	..	100
Detroit City Gas Co.	4,560,000	50	95¾	96
" Prior Lien 5's	4,598,000	1,000	99½	100
Detroit Gas Co., 5's	386,000	1,000	100	101
" Inc. 5's	16,000	100	100½	101
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	..	101
Fort Wayne	2,000,000	..	35	41
" Bonds	2,000,000	..	60	64
Grand Rapids Gas Lt. Co.	1,000,000	50	..	..
" 1st Mtg. 5's	1,125,000	1,000	..	..
Hartford	750,000	25	..	220
Hudson County Gas Co., of New Jersey	10,500,000	..	25	..
" Bonds, 5's	10,500,000	..	102	105
Indianapolis	2,000,000	..	100	105
" Bonds, 6's	2 650,000	..	101	103
Jackson Gas Co	250,000	50	72	78
" 1st Mtg. 5's	250,000	1,000	101	102½
Lafayette Gas Co., Ind.	1,000,000	100	40	45
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	106	
Laclede, St. Louis	7,500,000	100	75	77
Preferred	2,500,000	100	..	100
Bonds	10,000,000	1,000	110	110½
Madison Gas & Elec. Co.	400,000	100	82	..
" 1st Mtg. 6's	350,000	1,000	102½	108
Montreal, Canada	2,000,000	100	200	..
Newark, N. J., Con. Gas Co	6,000,000	..	..	..
Bonds, 6's	4,600,000	..	..	..
Essex and Hudson Gas Co.	6,500,000	..	35	40
New Haven	1,000,000	25	280	300
Nashville Gas Lt. Co.	1,000,000	50	110	..
Oakland, Cal.	2,000,000	..	43	45
" Bonds	750,000	..	..	..
Peoples G. L. & Coke Co., of Chicago	25,000,000	100	105¼	106
Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage	20,100,000	1,000	111⅝	111¼x
2d "	2,500,000	1,000	104	105
Rochester Gas & Elec. Co.	2,150,000	50	88	..
Preferred	2,150,000	50	118	..
Consolidated 5's	2,000,000		87½	90
San Francisco, Cal.	10,000,000	100	54	54½
St. Paul Gas Light Co.	1,500,000	100	57½	58½
1st Mortgage 6's	650,000	1,000	82	85
Extension, 6's	600,000	1,000	..	..
General Mortgage, 5's	2,428,000	1,000	88	90½
St. Joseph Gas Co.	1,000,000	100	42	44
" 1st Mtg. 5's	750,000	1,000	96½	98
Syracuse, N. Y.	1,750,000	100	..	15
Bonds	1,612 000	1,000	85	90
Washington, D. C	2,600,000	20	273½	273¾
First mortgage 6's	600,000	..	..	..
Western, Milwaukee	4,000,000	100	..	92
Bonds, 5's	3,830,500	.	104	106
Wilmington, Del.	600,000		220	50

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OFFICE OF THE UNITED GAS IMPROVEMENT CO.,
N. W. CORNER BROAD AND ARCH STS.,
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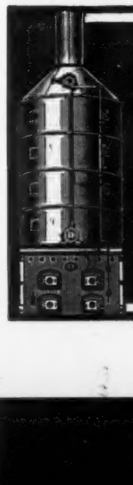

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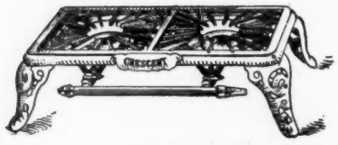

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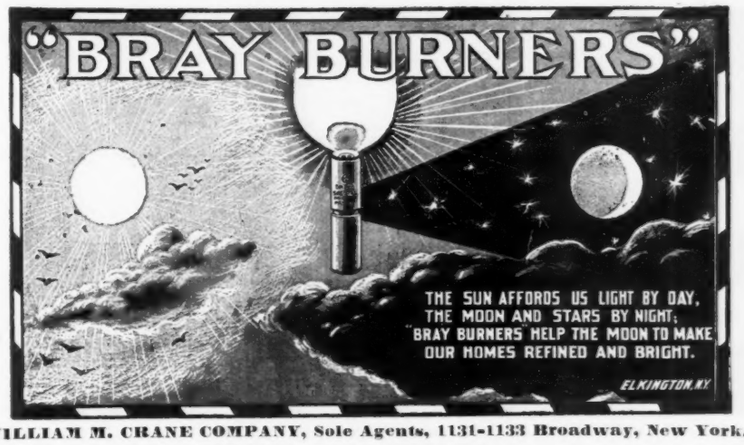
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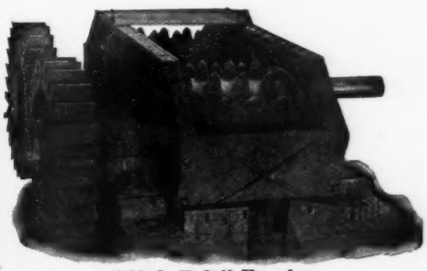

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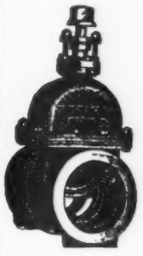

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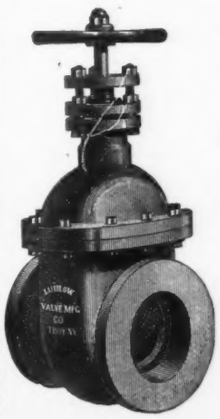

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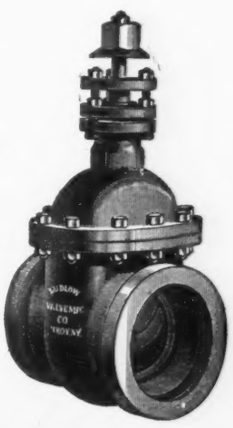

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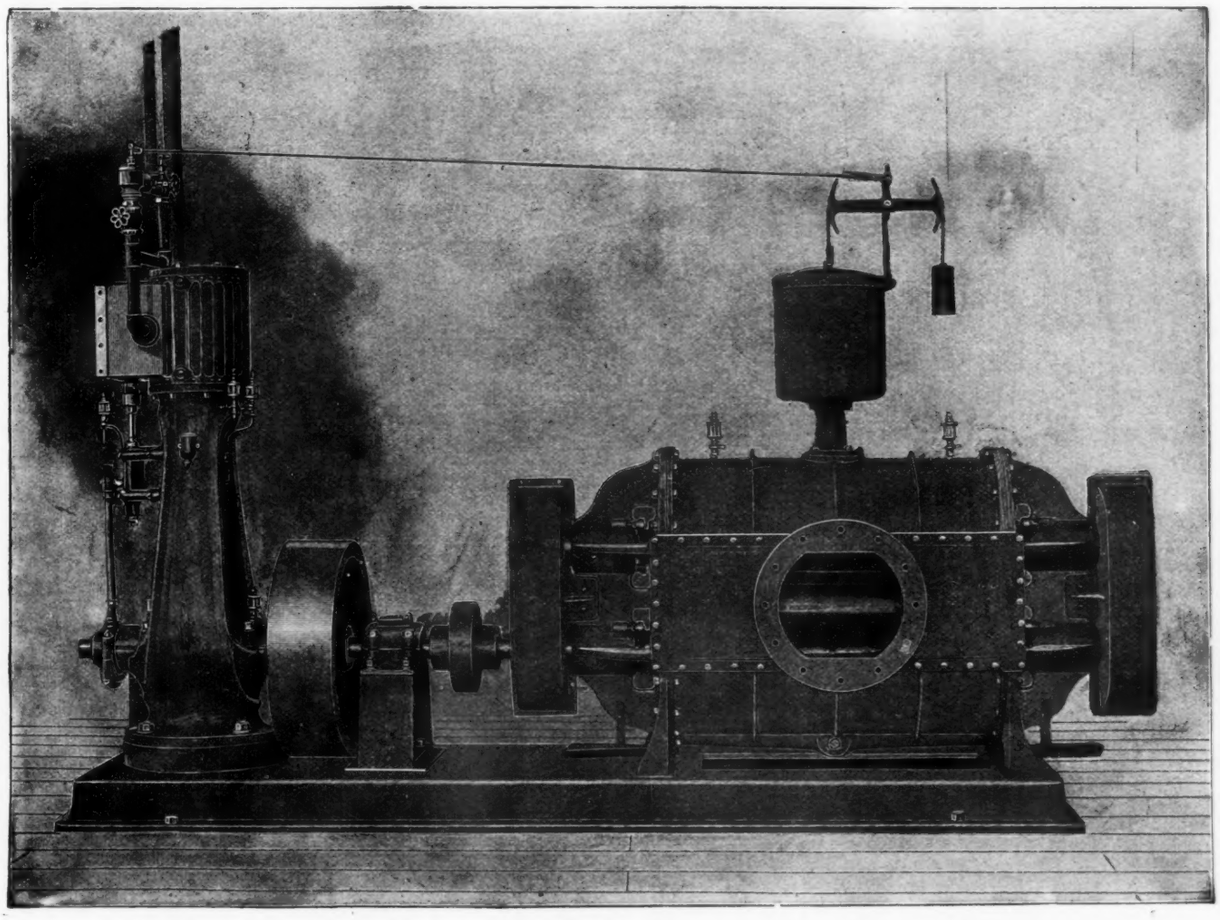

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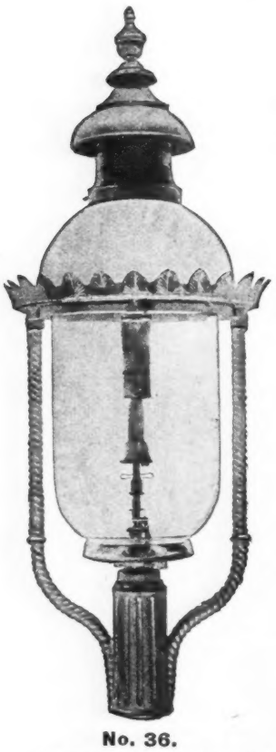

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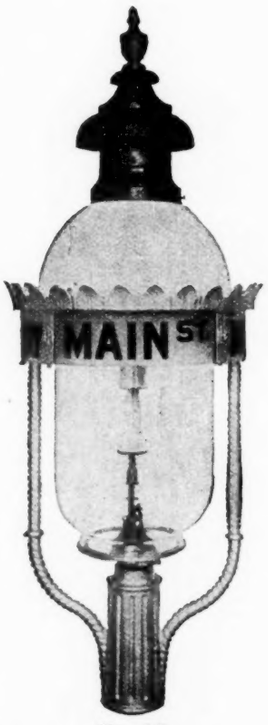
Where there are no gas mains we can furnish an equally good light by our SELF-GENERATING NAPHTHA WELSBACH BURNER, and thereby supply a uniform light in all localities.



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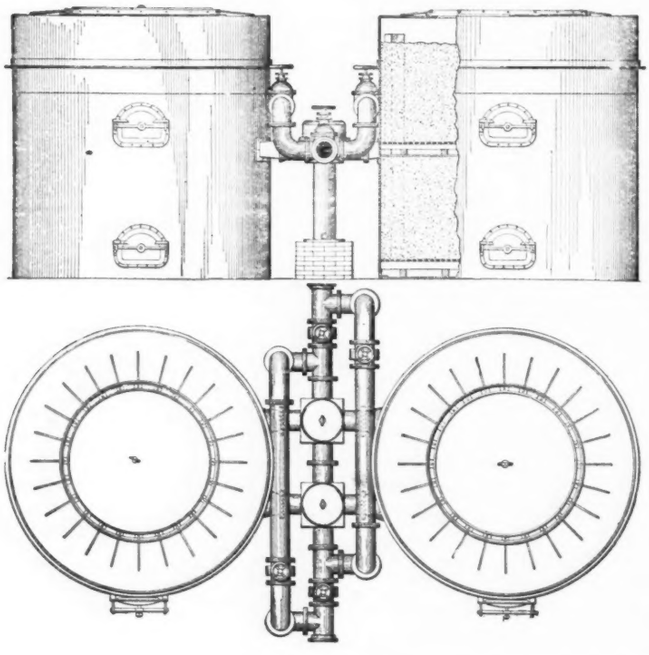
Correspondence solicited from Gas Companies and others interested in Municipal and outside lighting.



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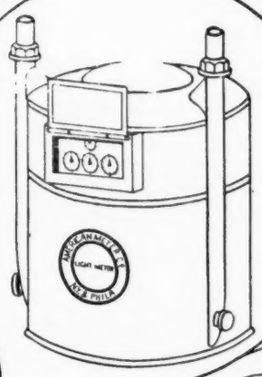

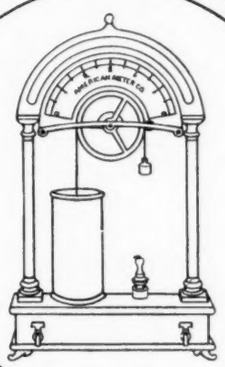

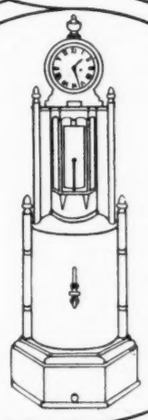

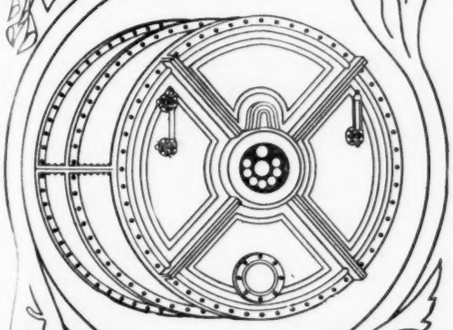

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NEW YORK AND PHILADELPHIA,

CHICAGO, ST. LOUIS,

SAN FRANCISCO.

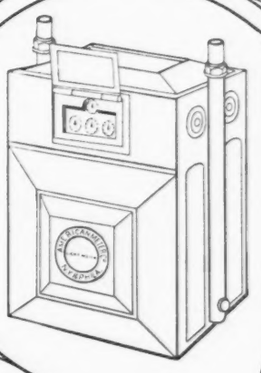
PUBLIC LIGHTING TABLE.

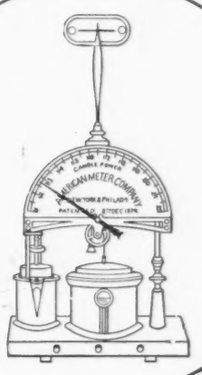
APRIL, 1900.

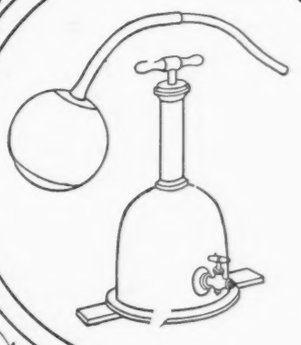
Day of Week.	Date.	Table No. 1. Following the Moon. Light.	Table No. 1. Extinguish.	Table No. 2. New York City. All Night Lighting. Light.	Table No. 2. Extinguish.
				P.M.	A.M.
Sun.	1	7.00 PM	4.40 AM	6.10	4.55
Mon.	2	7.00	4.40	6.15	4.40
Tue.	3	7.00	4.40	6.15	4.40
Wed.	4	11.10	4.40	6.15	4.40
Thu.	5	12.00	4.40	6.15	4.40
Fri.	6	12.40 AM FQ	4.40	6.15	4.40
Sat.	7	1.10	4.40	6.15	4.40
Sun.	8	1.40	4.30	6.15	4.40
Mon.	9	2.10	4.30	6.25	4.30
Tue.	10	2.30	4.30	6.25	4.30
Wed.	11	3.00	4.30	6.25	4.30
Thu.	12	3.20	4.30	6.25	4.30
Fri.	13	No L.	No L.	6.25	4.30
Sat.	14	No L. FM	No L.	6.25	4.30
Sun.	15	No L.	No L.	6.25	4.30
Mon.	16	7.10 PM	9.40 PM	6.30	4.20
Tue.	17	7.10	10.30	6.30	4.20
Wed.	18	7.10	11.30	6.30	4.20
Thu.	19	7.10	12.20 AM	6.30	4.20
Fri.	20	7.10	1.10	6.30	4.20
Sat.	21	7.10	1.50	6.30	4.20
Sun.	22	7.20 LQ	2.30	6.30	4.20
Mon.	23	7.20	3.10	6.40	4.10
Tue.	24	7.20	3.40	6.40	4.10
Wed.	25	7.20	4.10	6.40	4.10
Thu.	26	7.20	4.10	6.40	4.10
Fri.	27	7.20	4.10	6.40	4.10
Sat.	28	7.20 NM	4.10	6.40	4.10
Sun.	29	7.20	4.00	6.40	4.10
Mon.	30	7.20	4.00	6.45	4.00

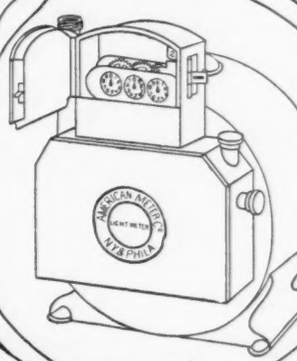
TOTAL HOURS LIGHTING DURING 1900.

By Table No. 1.	Hrs. Min.	By Table No. 2.	Hrs. Min.
January	230.50	January	423.20
February	175.40	February	355.25
March	189.00	March	355.35
April	160.30	April	298.50
May	150.40	May	264.50
June	137.00	June	234.25
July	152.00	July	243.45
August	171.50	August	280.25
September	187.20	September	321.15
October	213.10	October	374.30
November	221.50	November	401.40
December	231.50	December	433.45
Total, yr.	2221.40	Total, yr.	3987.45









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The name on the mantle—
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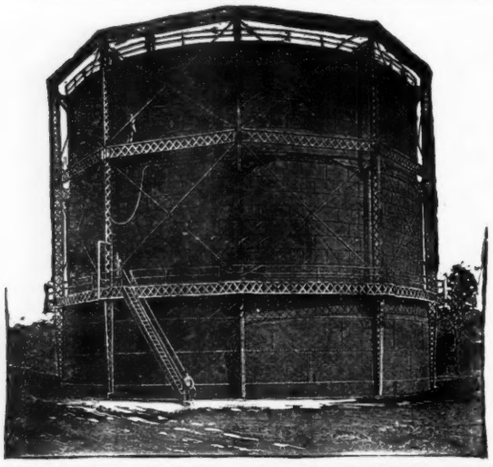

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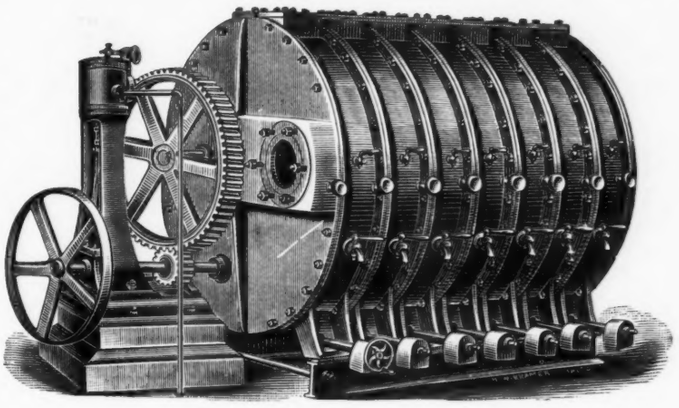

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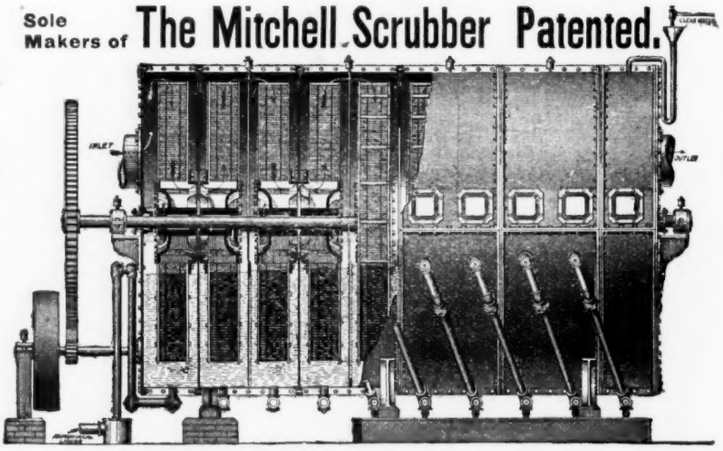

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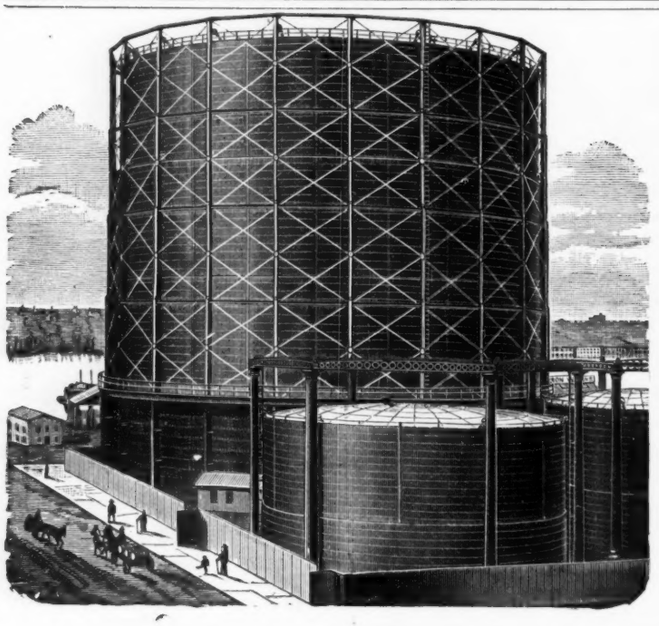

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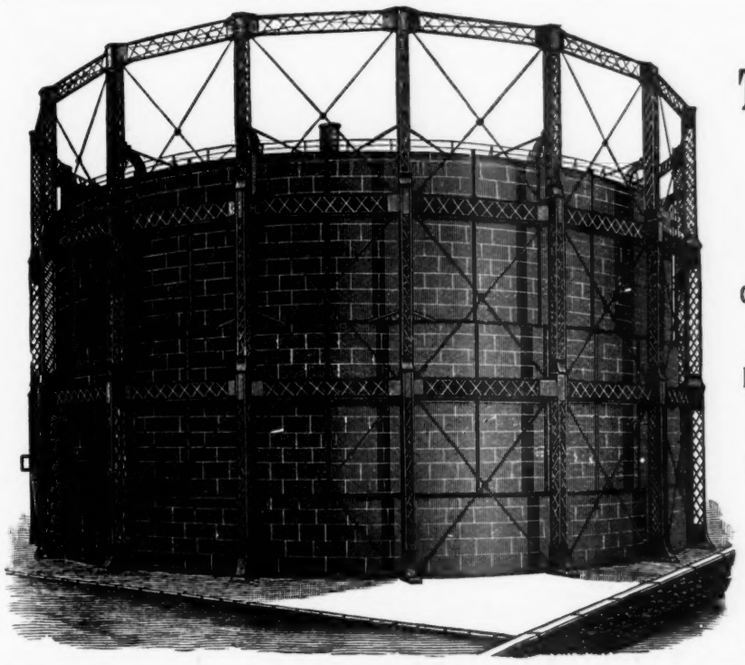

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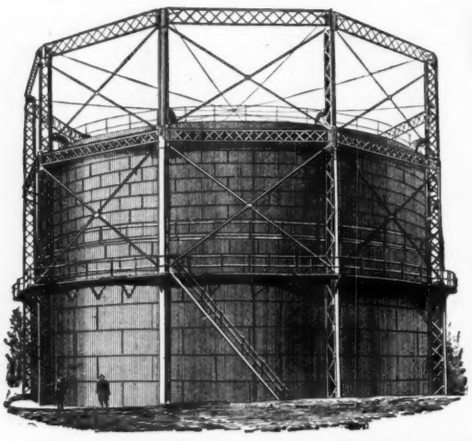

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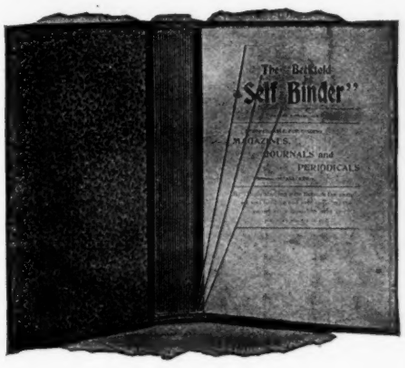

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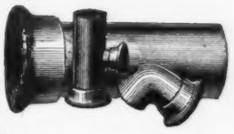

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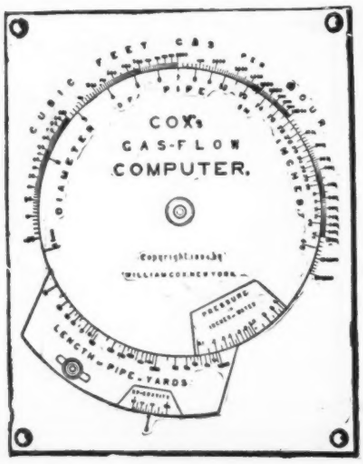

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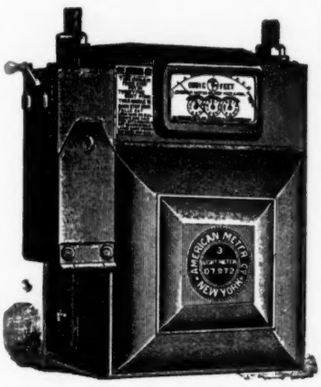

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